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ATLANTIC SAND STARGAZERS (PISCES: DACTYLOSCOPIDAE), WITH DESCRIPTION OF ONE NEW GENUS AND SEVEN NEW SPECIES

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ABSTRACT

The Atlantic dactyloscopids, including seven genera (two monotypic) and 17 species are reviewed and notes are included on generic relationships. Key, diagnoses and descriptions are provided and each species is illustrated. One new genus and seven new species are described and a neotype is selected for *Dactyloscopus poeyi* Gill. The genus *Dactyloscopus* is represented by *D. tridigitatus* Gill which ranges from the Bahamas and southeastern Florida to Brazil and along western Caribbean shores; *D. poeyi* Gill has a similar distribution but it is not recorded from Florida; *D. moorei* (Fowler) occurs along the Atlantic seaboard and in the Gulf of Mexico from North Carolina to Texas; *D. crossotus* Starks is known from the Bahamas to Barbados, from Brazil and from a short stretch of the southeastern Florida coast (Fort Pierce-Fort Lauderdale), it is not known from the Gulf of Mexico or western Caribbean; *D. boehlkei* n. sp. is described from the Bahamas; *D. comptus* n. sp. is known from the Bahamas and (provisionally) Puerto Rico and Virgin Is.; *D. foraminosus* n. sp. is described from off the mouth of the Amazon River, and a few specimens from southeastern Florida are provisionally referred to this species. Four genera are represented by single species: *Dactylagnus peratikos* Böhlke (Costa Rica, Panamá), *Myxodagnus belone* Böhlke (Bahamas, Puerto Rico), *Leurochilus acon* Böhlke (Bahamas, Lesser Antilles), and *Storrsia olsoni* n. gen. and sp. (Fernando de Noronha, Brazil). The genus *Gillellus* includes four Atlantic species: *G. uranidea* Böhlke (Bahamas, SE Fla., Antilles, W Caribbean), *G. greyae* Kanazawa (Bahamas, SE Fla., Antilles, Brazil and W Caribbean), *G. healae* n. sp. (S Carolina, E Fla., W Fla., Aruba) and *G. jacksoni* n. sp. (Lesser Antilles). There are two Atlantic species of *Platygillellus: P. rubrocinctus* (Longley), known from the Bahamas, southeastern Florida, the Antilles and W Caribbean, and *P. smithi* n. sp. from the Bahamas. Pending confirming collections, records of *Dactyloscopus tridigitatus* and *Gillellus greyae* from Bermuda are considered questionable. The family includes nine genera which appear to represent two principal lineages, the dactyloscopoids (*Dactyloscopus, Dactylagnus, Myxodagnus*) and the gillelloids which include all remaining genera except *Storrsia*. The latter appears to be intermediate between the dactyloscopoids and the gillelloids.

The blennioid family Dactyloscopidae includes nine recognized genera and 46 subordinate taxa of small, predominately marine, fishes which occupy shallow (0–137 m) sand and reef habitats in temperate to tropical environments [ca. 33°30'N–39°32'S (Pequeño, 1978)] on Atlantic and Pacific coasts of the Western Hemisphere.

Pacific dactyloscopids were reviewed by Dawson (1974; 1975; 1976; 1977) but the systematics, nomenclature and distribution of Atlantic forms have long been uncertain and confused. For several years, J. E. Böhlke (ANSP) and V. G. Springer (USNM) considered joint review of Atlantic populations, and a number of species descriptions were published by Böhlke (1968) and Böhlke and Caldwell (1961). However, other research interests prevented fruition of this project and it was subsequently agreed that I should undertake the problem. The results of my studies on the Atlantic sand stargazers, together with notes on family characters and generic relationships are presented here. Osteological and other studies by V. G. Springer and P. Wirtz (Max Planck Inst.), treating the blennioid affinities of the family, are in progress.

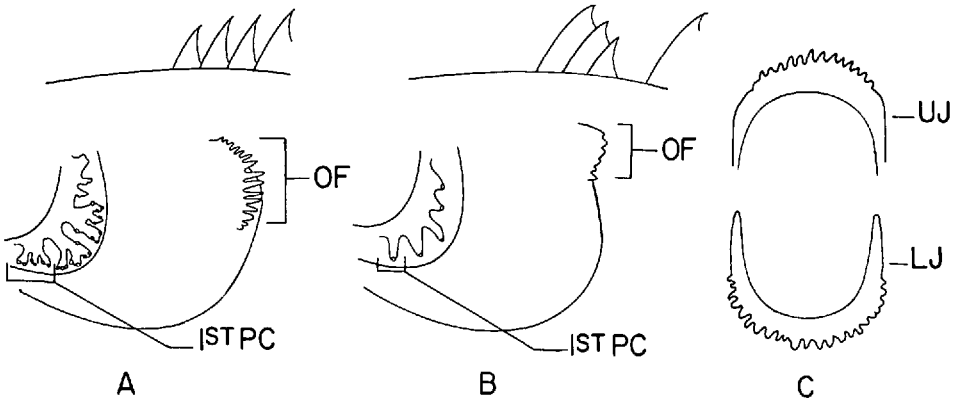


Figure 1. Diagrams of generalized *Dactyloscopus* (A) and *Gillellus* (B), illustrating opercular fimbriae (OF) and 1st principal preopercular canals (1st PC), and configuration of fimbriae on upper (UJ) and lower (LJ) lips of *Dactyloscopus* spp. (C).

Methods and Materials

Terminology, counts, and measurements, recorded in millimeters (mm), follow methods of Dawson (1969; 1974; 1975; 1976; 1977), but pertinent details are given here for convenience. Except where noted otherwise, standard length (SL) is used throughout; routine counts of anal spines and pelvic-fin rays, respectively II and I,3 in all dactyloscopids, have been omitted but all other fin rays are enumerated separately; number of dorsal spines is the total count of unsegmented dorsal-fin rays, including free spines and finlet supports; anal-fin ray counts include only the segmented rays; counts of opercular and labial fimbriae (Fig. 1) include all rudiments and fimbriae separate to the common base; counts of opercular fimbriae and pectoral-fin rays were recorded from both right and left sides of undamaged fish. Branching of segmented caudal-fin rays is indicated by the formula: number of upper simple rays + number of branched rays + number of lower simple rays. The posteriormost short spiniform caudal elements may be irregularly segmented in some specimens of *Gillellus* and *Platygillellus*, but these are omitted from counts of principal rays which include only the long, well-developed, segmented elements. Pectoral-fin length relationships are based on the straightened and adpressed fin. The term "transformed male" refers to mature fish, wherein the anal spines are angled caudad and the anterior segmented anal rays are angled forward, with the membranes stretched or expanded between. Counts of ovarian eggs include both ovaries.

Although the heads of all dactyloscopids possess an extensive and complex system of pored sensory canals, routine observations are here confined to the primary preopercular canals and to the suborbital canal (in some genera). Primary preopercular canals (usually 3) are the long simple or branched canals which reach to or near the margin of the lower limb or posterior angle of the preopercle (Fig. 1). The number of preopercular canal pores, an ontogenetic character in *Dactyloscopus* and *Dactylagnus*, includes all pores in the 1st (anterior) primary canal ventrad of the first branching. The 1st preopercular canal is unbranched and has a single distal pore in *Gillellus, Platygillellus, Leurochilus, Myxodagnus* and *Storrsia* but additional minute pores may occur in proximal portions of the canal.

Lateral-line scales are reported as number of scales in the arched portion of the lateral line (arched lateral-line scales), number of scales in the straight posterior portion of the lateral line (straight lateral-line scales) and total lateral-line scales. Arched lateral-line scales include all canal-bearing scales from lateral-line origin to and including the last scale of the descending arch, on which the scale canal fails to parallel those of the remaining lateral-line scales; straight lateral-line scales include all canal-bearing midlateral scales from end of arch to and including the terminal scale caudad. Counts of lateral-line scales were routinely made on the right side, but left side counts were substituted where right side squamation was incomplete. Counts of longitudinal scale rows were taken on a vertical near the origin of the straight lateral line and are reported as: scale rows between dorsal-fin base and lateral line + lateral line + rows between lateral line and anal-fin base. Some species are distingiushed by the presence or absence of scales above the lateral-line arch. These scales may be lost in old or poorly preserved material but scale pockets usually persist. Anterior extent of squamation above the arch is variable and may reach the lateral-line origin or merely extend a distance of several scales anteriad of the lateral-line deflection. As used here, the term "venter" refers to the lower parts of sides and ventral surface of the preanal region which is variously naked or scaled in genera of dactyloscopids.

Eyes of most sand stargazers are, to a greater or lesser extent, protrusile but they are often retracted or somewhat collapsed in preserved material. When this is the case, eyes (including eyestalks) may often be partly or wholly extended by application of bilateral pressure in the suborbital region. Eyes are often ornamented with dermal flaps, papillae, or pigmented spots on the distal surface, as well as with one or more flap-like fleshy proximal protrusions; all are best seen on well-extended eyes. Height of eye is the distance from rim of orbit to distal margin of the extended eye.

Some species are in part characterized by persistent concentrations of brown microchromatophores on the tongue and on membranes behind premaxillae and dentaries. Collectively, these markings are termed "oral pigmentation"; unless otherwise noted, color descriptions are from specimens preserved in alcohol.

Measurements are given only for primary types and stress is laid on meristics and morphological details rather than morphometry. Counts of vertebrae and predorsal bones (interneurals) are from radiographs; counts of caudal vertebrae include the terminal vertebra bearing the hypural. Although best suited for the identification of late juveniles and adults, the key should work well for early juveniles (10–15 mm SL) of most species.

Although abundant material is available for some species, studied Atlantic collections are numerically biased in favor of the Bahamas, southeastern Florida, and a few Caribbean and South Atlantic localities. In contrast to observations on several Pacific populations, Atlantic materials fail to indicate well-defined geographic variation in examined meristic features. This may or may not reflect sample bias but geographic variation in meristics is not treated in species descriptions.

Materials examined include virtually all known museum holdings, but, in cases of abundant samples, meristic data were not taken on all specimens. Collections are generally listed from north to south in the following sequence: Bermuda, United States, Bahamas, Greater and Lesser Antilles, thence to insular and mainland regions along western shores from México to Brazil. Subordinate political divisions (states, counties) are employed where contributing information on distribution. Depths have been converted to metric equivalents.

Abbreviations for repositories of examined materials are: AMNH—American Museum of Natural History, New York; ANSP—Academy of Natural Sciences of Philadelphia; BMNH—British Museum (Natural History), London; CAS—California Academy of Sciences, San Francisco; CAS-IU—Indiana University collections, now at CAS; CAS-SU—Stanford University collections, now at CAS; CNP—Universidad de Nicaragua, Managua; FAU—Florida Atlantic University, Boca Raton; FDNR—Florida Department of Natural Resources, St. Petersburg; FMNH—Field Museum of Natural History, Chicago; FSM—Florida State Museum, Gainesville; FSU—Florida State University, Tallahassee; GBERL—Gulf Breeze Environmental Research Laboratory, Gulf Breeze, Fla.; GCRL—Gulf Coast Research Laboratory Museum; GMBL—Grice Marine Biological Laboratory, Charleston; HBF—Harbor Branch Foundation, Smithsonian Institution, Fort Pierce, Fla.; LACM—Los Angeles County Museum; MCZ—Museum of Comparative Zoology, Harvard University; MNI—Museu Nacional do Rio de Janeiro; MPM—Milwaukee Public Museum; MZUSP—Museu de Zoologia, Universidade de São Paulo; RMNH—Rijksmuseum van Natuurlijke Historie, Leiden; SCMRI—South Carolina Marine Resources Institute, Charleston; SIO—Scripps Institution of Oceanography, La Jolla; TAMU—Texas A & M University, College Station; UDONECI—Centro de Investigaciones Cientificas del Nucléo de Nueva Esparta de la Universidad de Oriente, Boca del Rio, Isla Margarita, Venezuela; UMML—University of Miami, Rosenstiel School of Marine and Atmospheric Science; UMMZ—University of Michigan Museum of Zoology, Ann Arbor; UNC—University of North Carolina, Morehead City; USA—University of South Alabama, Mobile; USNM—National Museum of Natural History , Smithsonian Institution, Washington, D.C.; UWF—University of West Florida, Pensacola; ZMA—Zoölogisch Museum, Amsterdam.

Family Characters

The family Dactyloscopidae is characterized as follows: body somewhat elongate, laterally compressed posteriad; eyes superior, more or less protrusile; two pair of nares; gape oblique to subvertical; lips with or without fimbriae; gill membranes separate and free from isthmus; opercles with ventral margins overlapping below isthmus and with fimbriae on posterodorsal margins; dorsal fin continuous or not, with anterior spines followed by segmented rays; anal spines II; pelvic fins I,3; caudal fin with 10–12 simple or branched segmented rays, other fin-rays simple; sensory canal system of head well developed; lateral line arched anteriad; scales cycloid; jaw teeth conical, none enlarged, in 2–4 rows near symphyses, usually in 1–2 rows posteriad; 3 complete gill arches plus a hemibranch with pore behind, without well-developed gill rakers; pseudobranchiae present; premaxillae

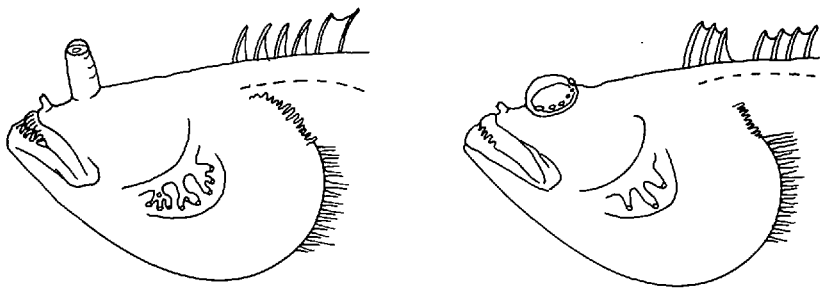


Figure 2. See Key to the Dactyloscopids (2b).

somewhat protractile; ectopterygoid and mesopterygoid represented by a single bone; parasphenoid absent; single bone represents infrapharyngobranchials 2–4; upper pectoral-fin ray articulates with upper radial; dorsal spines 7–23; segmented dorsal-fin rays 12–36; segmented anal-fin rays 21–41; pectoral-fin rays 11–16, modally 12–15; lateral-line scales 33–73; vertebrae 10–13 + 23–42; maximum size approximately 150 mm SL.

Key to Subadult and Adult Atlantic Dactyloscopids

1a. Dorsal-fin origin on nape 2
1b. Dorsal-fin origin behind nape, near vertical from anal-fin origin 15
2a. Dorsal fin without a distinct anterior finlet; 1st preopercular canal branched, with 2 or more distal pores (Fig. 2a) 3
2b. Dorsal fin with an isolated or semi-isolated anterior finlet; 1st preopercular canal not branched, with a single distal pore (Fig. 2b) 9
3a. Posterior naris (a single pore) located on anterior rim of preorbital, adjacent to base of tubiform anterior naris (Fig. 3a); premaxillary pedicels reach well past rear margins of orbits 4
3b. Posterior naris (a patch of 1–8 pores) located on preorbital, between tubiform anterior naris and eye (Fig. 3b); premaxillary predicels usually not reaching past rear margins of orbits ..... *Dactyloscopus crossotus* Starks, p. 23
4a. Last lateral-line scale, the penultimate scale on lower part of caudal-fin base (Fig. 4a, b), not overlying a distinct notch-like depression in ventral margin of caudal peduncle (some with small notch below hypural); expanded eyestalk not exceptionally long and slender 5
4b. Last lateral-line scale, the terminal scale on lower part of caudal-fin base (Fig. 4c), overlies a distinct notch-like depression in ventral margin of caudal peduncle; expanded eyestalk long and slender ..... *Dactyloscopus tridigitatus* Gill, p. 25
5a. Dorsal spines modally 10; distal pore of canal of last lateral-line scale located on or near ventral margin of caudal-fin base (Fig. 4a) 6
5b. Dorsal spines modally 11–13; distal pore of canal of last lateral-line scale located well above ventral margin of caudal-fin base (Fig. 4b) 7
6a. Total dorsal-fin elements 39–41 (usually 40); segmented anal-fin rays 32–33; preopercular canal pores 6–16; without persistent dark markings on dorsum ..... *Dactyloscopus boehlkei* new species, p. 29
6b. Total dorsal-fin elements 40–42 (usually 41); segmented anal-fin rays 33–34; preopercular canal pores 21–90; with persistent dark markings on dorsum ..... *Dactyloscopus foraminosus* new species, p. 32
7a. Segmented anal-fin rays 30–35 (usually 31–34); upper lip fimbriae 11–18 (usually 13–17); eye without a distal ring of translucent spots or dermal flaps 8
7b. Segmented anal-fin rays 28–30; upper lip fimbriae 10–13 (usually 11–12); eye with a distal ring of translucent spots or dermal flaps ..... *Dactyloscopus comptus* new species, p. 34
8a. Dorsal fin usually continuous; total dorsal-fin elements 38–41; segmented anal-fin rays 30–34 (usually 31–33); dorsum usually with 2–4 scale rows in advance of line between origins of

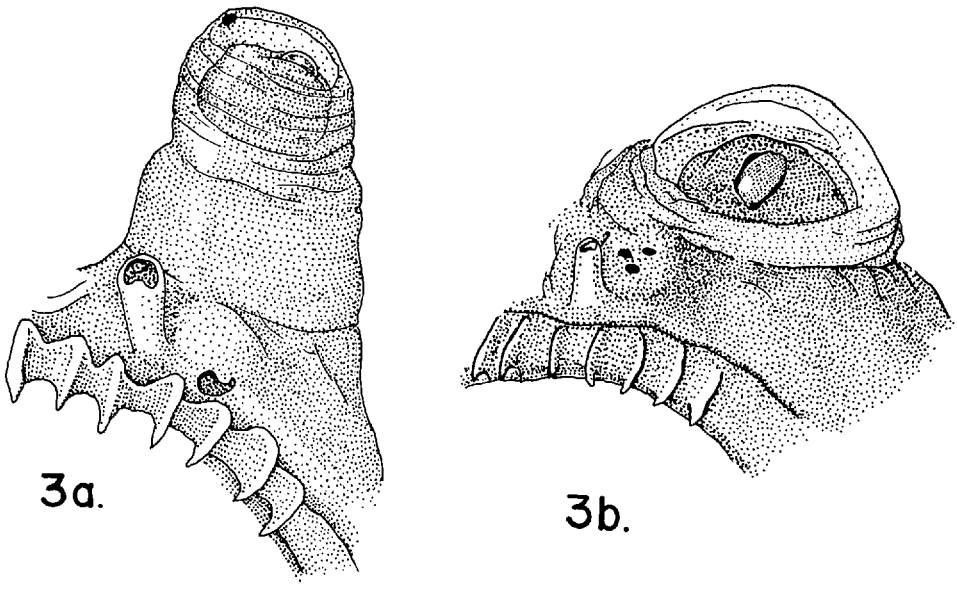


Figure 3. See Key to the Dactyloscopids (3a).

dorsal fin and lateral line (Fig. 5a); total lateral-line scales 43–47 (usually 44–46) ..... *Dactyloscopus moorei* (Fowler), p. 37

8b. Dorsal fin usually with 2–3 free anterior spines; total dorsal-fin elements 40–43; segmented anal-fin rays 32–35 (usually 33–34); dorsum usually naked in advance of line between origins of dorsal fin and lateral line (Fig. 5b); total lateral line scales 45–48 (usually 46–48) ..... *Dactyloscopus poeyi* Gill, p. 40

9a. Upper lip without fimbriae; pectoral-fin rays modally 13; venter naked 10

9b. Upper lip with fimbriae; pectoral-fin rays modally 14; venter scaled 14

10a. Segmented caudal-fin rays modally 10; arched lateral-line scales 22–33 11

10b. Segmented caudal-fin rays modally 11; arched lateral-line scales 14–17 ..... *Leurochilus acon* Böhlke, p. 48

11a. Dorsal spines 11–15 12

11b. Dorsal spines 17–20 13

12a. Segmented dorsal-fin rays 14–17; total lateral-line scales 36–41 ..... *Gillellus uranidea* Böhlke, p. 53

12b. Segmented dorsal-fin rays 27–29; total lateral-line scales 47–48 ..... *Gillellus healae* new species, p. 56

13a. Segmented anal-fin rays 28–30; lower lip fimbriae 2–4; straight lateral-line scales 18–19 ..... *Gillellus jacksoni* new species, p. 57

13b. Segmented anal-fin rays 31–35; lower lip fimbriae 4–16 (usually 5–11); straight lateral-line scales 22–25 ..... *Gillellus greyae* Kanazawa, p. 59

14a. Dorsal finlet with 3 spines, its height about half of predorsal length; segmented anal-fin rays 23–27; straight lateral-line scales 15–19 (Fig. 6a) ..... *Platygillellus rubrocinctus* (Longley), p. 62

14b. Dorsal finlet with 4 spines, its height about equals predorsal length; segmented anal-fin rays 22; straight lateral-line scales 11–12 (Fig. 6b) ..... *Platygillellus smithi* new species, p. 67

15a. Lower jaw broadly rounded in dorsal aspect, neither conical nor strongly protruding in front 16

15b. Lower jaw narrowly rounded in dorsal aspect, conical and strongly protruding in front ..... *Myxodagnus belone* Böhlke, p. 69

16a. Posterior naris a pore located on preorbital between tubiform anterior naris and orbit; segmented anal-fin rays 33–35; straight lateral-line scales 32–34 ..... *Dactylagnus peratikos* Böhlke and Caldwell, p. 75

16b. Posterior naris a tubiform process on rim of preorbital, adjacent to base of tubiform anterior naris; segmented anal-fin rays 26; straight lateral-line scales 23 ..... *Storrsia olsoni* new genus and species, p. 82

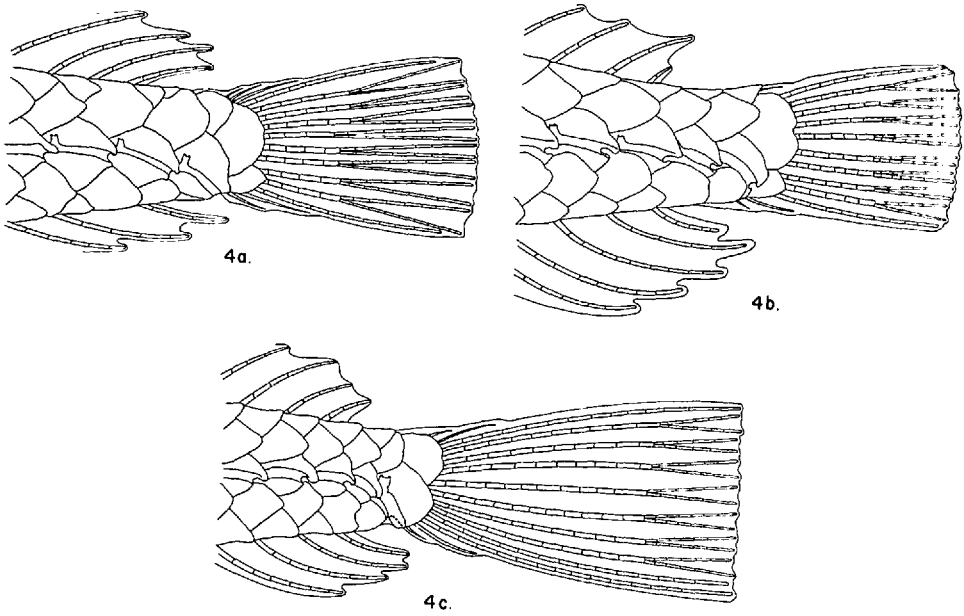


Figure 4. See Key to the Dactyloscopids (5a).

Genus *Dactyloscopus* Gill

Dactyloscopus Gill, 1859:132 (type-species: *Dactyloscopus tridigitatus* Gill 1859, by original designation).

Esloscopus Jordan and Evermann, 1896:465 (as subgenus of *Dactyloscopus;* type-species: *Dactyloscopus zelotes* Jordan and Gilbert 1896 (=*Dactyloscopus* sp. nov. Jordan and Gilbert, 1882), by original designation).

Congrammus Fowler, 1906:105 (type-species: *Congrammus moorei* Fowler 1906, by original designation).

Cokeridia Meek and Hildebrand, 1928:905 (type-species: *Cokeridia crossota* Meek and Hildebrand 1928 (=*Dactyloscopus amnis* Miller and Briggs), by original designation).

Paramyxodagnus Carvalho and Pinto, 1965:108 (type-species: *Paramyxodagnus moreirai* Carvalho and Pinto 1965 (=*Dactyloscopus crossotus* Starks), by original designation).

Paragillellus Carvalho and Pinto, 1965:112 (type-species: *Paragillellus macropoma* Carvalho and Pinto 1965 (=*Dactyloscopus tridigitatus* Gill), by original designation).

Springeria Carvalho and Pinto, 1965:113 (type-species: *Springeria santosi* Carvalho and Pinto 1965 (=*Dactyloscopus crossotus* Starks) by original designation).

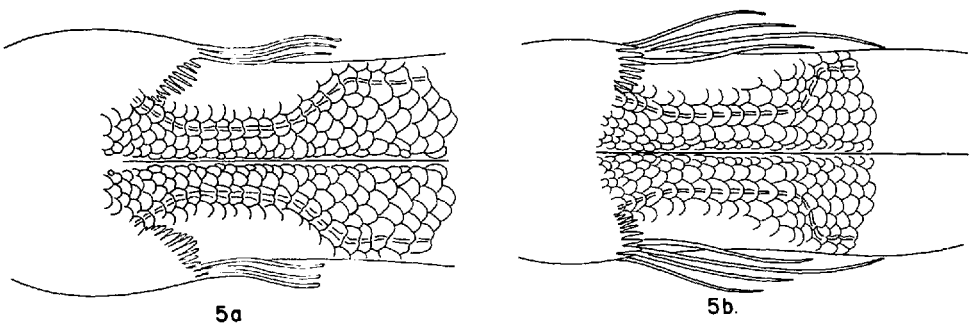


Figure 5. See Key to the Dactyloscopids (8a).

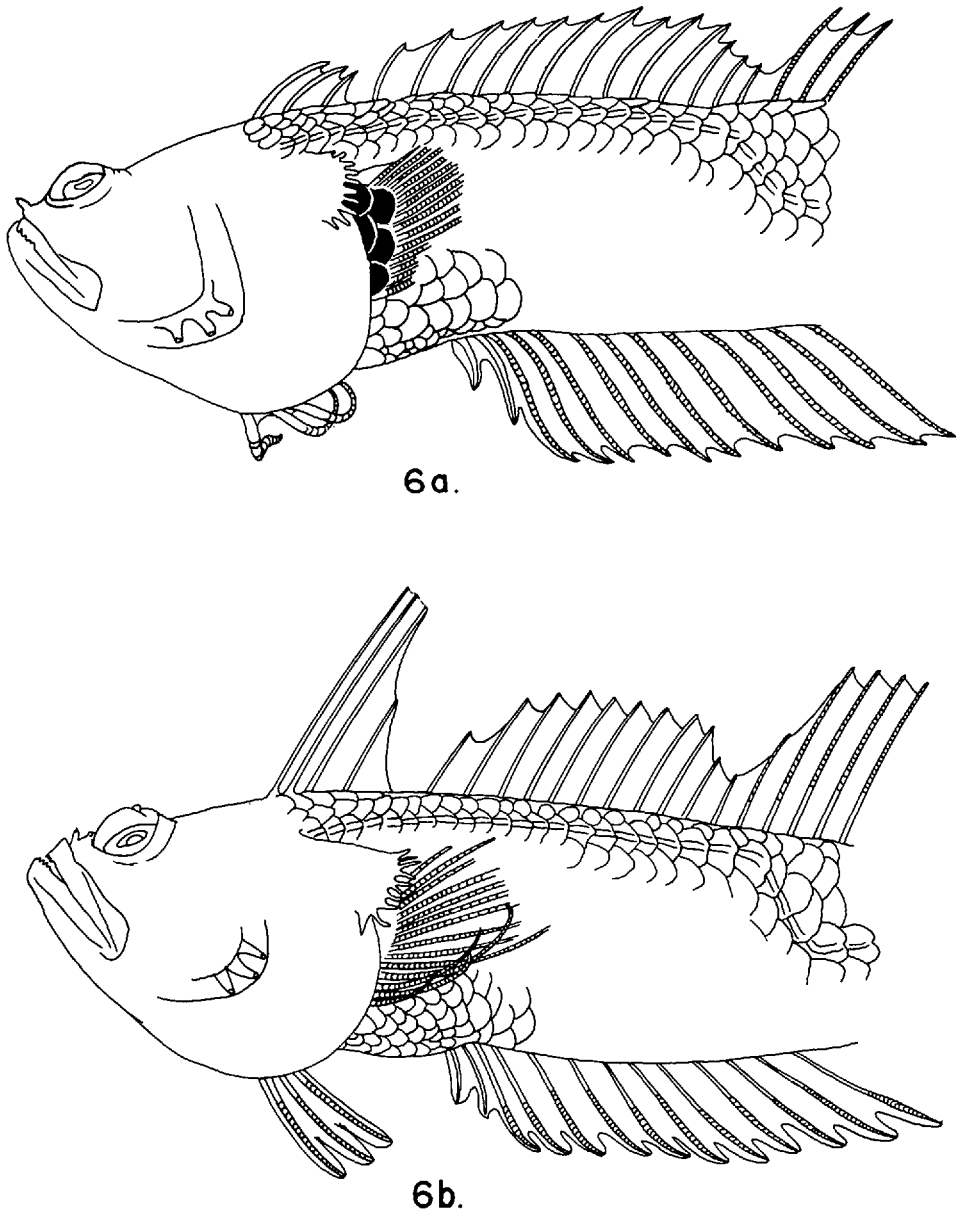


Figure 6. See Key to the Dactyloscopids (14a).

Tamandareia Carvalho and Pinto, 1965:114 (type-species: *Tamandareia oliverai* Carvalho and Pinto 1965 (=*Dactyloscopus tridigitatus* Gill), by original designation).

Jopaica Pinto, 1970:47 (replacement name for *Springeria* (preoccupied by *Springeria* Bigelow and Schroeder, 1951: Pisces; Dasyatidae); type-species: *Springeria santosi* Carvalho and Pinto, by original designation).

Diagnosis.—Dorsal-fin origin on nape; dorsal fin continuous or with 1–7 free anterior spines, without an isolated or semi-isolated anterior finlet; lower jaw without a conical elongate fleshy projection, more or less broadly rounded in

Table 1. Ontogenetic development of branching of segmented caudal-fin rays in selected Atlantic species of *Dactyloscopus*. N = number of specimens; standard length range and mean ($\bar{x}$) in mm

	crossotus			*tridigitatus*			*boehlkei*			*poeyi*		
Fin-ray formula	N	SL Range	$\bar{x}$	N	SL Range	$\bar{x}$	N	SL Range	$\bar{x}$	N	SL Range	$\bar{x}$
All simple	3	19–22	20.6	17	14–21	17.6				5	12–15	14.2
4 + 1 + 5	1		23.8									
4 + 2 + 4	1		23.1	3	23–24	23.3				1		33.1
4 + 3 + 3				1		22.7						
4 + 4 + 2	1		26.3	1		32.2						
3 + 1 + 6				1		25.8						
3 + 2 + 5	1		36.1									
3 + 3 + 4				1		26.1						
3 + 4 + 3	1		23.1	2	26–27	26.6				1		25.9
3 + 5 + 2				3	34–43	46.6				1		24.6
2 + 3 + 5				1		55.0						
2 + 5 + 3	7	27–38	31.8	18	22–56	38.7	1		21.8	11	20–41	32.7
2 + 6 + 2	29	23–52	34.6	116	23–64	42.2	12	22–36	28.8	33	25–63	41.4
2 + 7 + 1	4	33–51	40.3	3	47–58	51.3				1		42.1
1 + 5 + 4				1		36.2						
1 + 6 + 3	1		37.3	4	46–53	50.4	1		30.5	6*	29–48	42.4
1 + 7 + 2	48	26–60	39.0	202	28–71	48.1	14	25–42	34.0	45	30–61	41.8
1 + 8 + 1	78*	28–63	43.9	53	30–66	50.8	13*	28–50	40.9	21	34–66	52.4

* Primary type.

dorsal aspect (except *crossotus*); fimbriae present on opercle and lips; anterior naris tubiform, located on or adjacent to anterior rim of preorbital; posterior naris a single pore located ventrally on rim of preorbital adjacent to base of anterior naris, or a patch of 1–8 pores located on an elevated fleshy process between anterior naris and orbit (Fig. 3); eyes slightly protrusile to clearly stalked, with or without dermal flaps, papillae or pigmented spots; scales absent from head, pectoral-fin base and venter; scales more numerous in straight lateral line than in arched portion; canals of straight lateral-line scales usually branched anteriad; tip of adpressed pectoral fin reaches beyond descending portion of lateral-line arch; principal preopercular canals 3, the 1st always branched and with two or more distal pores; pectoral-fin rays modally 13; caudal-fin rays typically 10; premaxillary pedicel usually reaches to or beyond rear margin of orbit; without predorsal interneurals; caudal vertebrae 25–41.

Description.—See Dawson, 1975.

Comparisons.—Among genera of dactyloscopids, only *Dactyloscopus* and the monotypic eastern Pacific *Sindoscopus* Dawson share the combination of dorsal-fin origin on nape and absence of an isolated or semi-isolated anterior dorsal finlet. *Dactyloscopus* differs from this genus in having three branched primary preopercular canals (4 unbranched canals in *Sindoscopus*) and in lower counts of dorsal spines (9–15 against 20–22), pectoral-fin rays (modally, 13 against 14) and total lateral-line scales (36–54 against 59–70). Furthermore, premaxillary pedicels seldom reach past the middle of the orbit in *Sindoscopus*, whereas they typically reach to or past the rear margin of the orbit in *Dactyloscopus*.

Remarks.—Unlike Pacific populations of *Dactyloscopus* wherein five of the nine species have typically unbranched caudal-fin rays (Dawson, 1975), branching of caudal-fin rays is ontogenetic in all Atlantic species. There is considerable variation in the development of branching with increasing SL (Table 1), but all rays are simple in early juveniles and subsequent development ultimately results in

Table 2. Comparison of standard length with frequency of opercular fimbriae, preopercular canal pores, upper and lower lip fimbriae in Atlantic species of *Dactyloscopus*. N = number of specimens; $\bar{x}$ = mean; σ = standard deviation; r = coefficient of correlation

Character / Species	N	Standard length Range	$\bar{x}$	σ	Character Range	$\bar{x}$	σ	r	Regression equation
Opercular fimbriae									
crossotus	410	19–63	39.6	8.4	7–15	11.8	1.6	0.494	y = 8.081 + 0.095x
tridigitatus	1,014	14–75	45.4	11.5	8–19	13.0	1.5	0.410	y = 10.541 + 0.054x
boehlkei	111	22–55	34.2	7.8	13–22	17.4	1.9	0.689	y = 11.735 + 0.166x
foraminosus	24	41–74	62.8	10.3	17–22	19.3	1.5	0.412	y = 15.612 + 0.059x
comptus	110	13–39	27.2	4.7	11–21	15.8	1.5	0.595	y = 10.626 + 0.189x
moorei	253	19–75	43.8	10.6	9–22	17.2	1.9	0.455	y = 13.575 + 0.082x
poeyi	508	12–67	38.2	10.0	9–24	18.5	2.4	0.537	y = 13.511 + 0.132x
Preopercular canal pores									
crossotus	210	19–63	39.5	8.4	2–12	4.8	2.2	0.122	y = 3.552 + 0.032x
tridigitatus	512	14–75	45.3	11.6	2–11	4.8	1.4	0.329	y = 3.080 + 0.039x
boehlkei	59	22–55	33.5	7.9	6–16	9.4	2.3	0.659	y = 3.167 + 0.186x
foraminosus	13	41–74	62.6	10.1	23–90	53.8	4.9	0.560	y = −7.296 + 0.975x
comptus	55	13–39	27.2	4.8	2–13	6.2	2.1	0.678	y = −1.928 + 0.299x
moorei	129	19–75	44.2	11.0	3–18	9.5	3.1	0.440	y = 3.961 + 0.125x
poeyi	260	12–67	38.0	10.0	2–24	12.9	3.6	0.487	y = 6.222 + 0.177x
Upper lip fimbriae									
crossotus	204	19–63	39.8	8.4	9–16	12.9	1.1	0.336	y = 11.191 + 0.042x
tridigitatus	473	13–72	45.0	11.4	11–20	13.6	1.0	0.350	y = 12.154 + 0.031x
boehlkei	57	22–55	34.4	7.8	13–16	14.3	0.9	0.162	y = 13.660 + 0.018x
foraminosus	12	41–71	59.8	9.7	14–18	16.3	1.5	0.388	y = 12.736 + 0.060x
comptus	52	13–39	27.1	4.4	10–13	11.7	0.8	0.069	y = 12.084 − 0.013x
moorei	113	19–75	43.5	10.8	11–18	14.4	1.2	0.049	y = 14.191 + 0.006x
poeyi	251	12–67	37.9	10.1	13–18	15.8	0.9	0.221	y = 14.985 + 0.021x
Lower lip fimbriae									
crossotus	189	19–63	39.6	8.4	15–23	19.7	1.4	0.368	y = 17.379 + 0.059x
tridigitatus	453	14–71	44.7	11.7	18–26	21.5	1.3	0.224	y = 20.434 + 0.024x
boehlkei	53	22–55	35.1	7.6	22–26	24.5	1.1	0.216	y = 23.444 + 0.031x
foraminosus	11	41–74	60.9	11.0	24–27	25.3	1.3	0.117	y = 24.449 + 0.134x
comptus	52	13–39	27.2	4.4	18–22	20.0	1.0	0.034	y = 19.290 + 0.008x
moorei	111	19–75	43.6	10.6	17–28	22.7	1.9	0.290	y = 20.362 + 0.053x
poeyi	250	12–67	38.1	10.2	19–26	22.5	1.1	0.142	y = 21.911 + 0.015x

eight branched rays with a simple ray above and below. Frequencies of opercular fimbriae, preopercular canal pores, and, to a lesser degree, labial fimbriae increase during ontogeny in Atlantic species. Although the modal value or maximum range may be adequate for species identification, regression equations and associated data for these characters are provided in Table 2. Some Pacific species have profusely branched labial fimbriae in adults and one species (*D. amnis*) has the last dorsal- and anal-fin rays bound to the caudal peduncle by membranes. These membranes are lacking in Atlantic species and labial fimbriae are typically simple, except in large specimens wherein they infrequently branch near the tips. The anterior dorsal-fin spines usually bear a posterior membrane which may be incised to the fin-base resulting in a free-standing spine, or the membrane may unite above the fin-base with the next spine to form a continuous fin. These membranes are often damaged but the number of free spines can usually be determined. Two species (*D. boehlkei, D. moorei*) usually have a continuous fin (Table 3), whereas other Atlantic species usually have one or more free anterior spines.

Maximum recorded depth of capture is 137 m; maximum known size is 93.0

Table 3. Frequency distributions of free anterior dorsal-fin spines in Atlantic species of *Dactyloscopus*

Species	Number of free spines					
	0	1	2	3	4	5
crossotus			39	104	31	1
tridigitatus	5	1	74	396	30	
boehlkei	55	1				
foraminosus	2	1	2	4	1	
comptus	4	1	42	8		
moorei	92	8	6	2		
poeyi	4	4	22	153	32	1

mm SL. The genus is represented by nine species and four subspecies in Pacific waters (Dawson, 1977) and seven Atlantic species are treated here.

Dactyloscopus crossotus Starks
Figure 7

Dactyloscopus crossotus Starks, 1913:70, pl. 12 (original description; Natal, Brazil).
Paramyxodagnus moreirai Carvalho and Pinto, 1965:108, figs. 1–5 (original description; Ilha Grande, State of Rio de Janeiro, Brazil).
Paramyxodagnus mangaratibensis Carvalho and Pinto, 1965:110, figs. 6–7 (original description; Mangaratiba, State of Rio de Janeiro, Brazil).
Springeria santosi Carvalho and Pinto, 1965:113, fig. 10 (original description; Arraial do Cabo, Cabo Frio, State of Rio de Janeiro, Brazil).
Jopaica santosi. Pinto, 1970:47 (new combination).

Diagnosis.—Posterior naris on preorbital between anterior naris and eye (Fig. 3b); last lateral-line scale the penultimate scale on lower part of caudal-fin base; typically with a slight notch in ventral margin of caudal-fin base; diameter of pigmented eye greater than length of extended eyestalk; eye with or without mesiodistal spot; dorsal fin discontinuous; total dorsal-fin rays usually 41–42; preopercular canal pores 12 or less; modally 15 scales in lateral-line arch; premaxillary pedicel not reaching past rear margin of orbit.

Description.—Measurements (mm) of 43.8 mm SL, male, holotype follow: caudal-fin length 6.6, length of uppermost segmented caudal-fin ray 5.4, length of lowermost segmented caudal-fin ray 5.4, body depth 5.8, predorsal length 8.7, preanal length 11.3, head length 8.3, head breadth 5.0, maxillary to upper opercular angle 7.2, maxillary to upper preopercular angle 5.4, diameter of bony orbit 1.4, postorbital length 4.3, upper jaw length 3.2.

See Tables 1–16 for meristic data.

Anterior profile narrowly rounded to somewhat triangular in dorsal aspect (Fig. 7). Dorsal fin with 2–5 (usually 3) free anterior spines (Table 3), the anterior 1–2 often vestigial or adnate to dorsum; adults with 6–8 branched caudal-fin rays (Table 1); posterior naris with 1–8 minute pores, the frequency ontogenetic; preopercular canal pores 7 or less in 88% of specimens examined; eyestalk not elongate, height less than orbit diameter.

Scales above lateral-line arch usually in two rows below 2nd–3rd dorsal spines, reduced to a single row posteriad; last lateral-line scale, the penultimate scale, with canal directed ventrally and overlying a slight notch in ventral margin of caudal-fin base (Fig. 4a); longitudinal scale rows 4 + 1 + 4. Pseudobranchiae 5

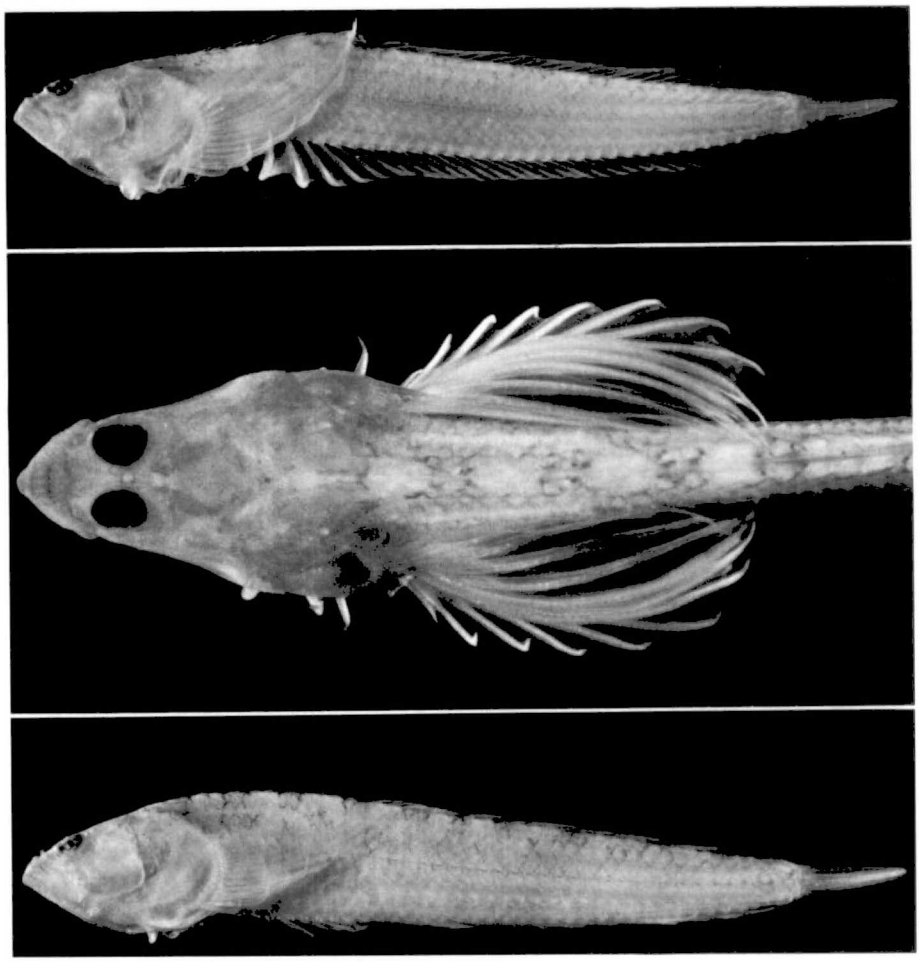


Figure 7. *Dactyloscopus crossotus* Starks. Top and middle: Transformed male (41.3 mm SL). Bottom: Adult female (44.0 mm SL), GCRL 9887.

or 6 (one specimen examined); premaxillary pedicel short, reaches to or near rear margin of orbit.

Coloration.—Mainly light tan, often without persistent markings other than the relatively large blackish eye; well-marked specimens with 8–12 rather indistinct short brownish bars crossing dorsum and upper parts of sides between nape and caudal-fin base (Fig. 7); cheek and opercle iridescent silvery in some specimens; oral pigmentation present.

Comparisons.—Characters in key and diagnosis clearly separate *D. crossotus* from Atlantic congeners. The combination of large eye, narrowed anterior profile, and relatively short premaxillary pedicel allows rapid separation of *D. crossotus* from other Atlantic species. Posterior naris location between anterior naris and eye is shared with three Pacific species (*D. lacteus, D. minutus, D. metoecus*) but this naris is on the anterior rim of the preorbital in all other congeners.

Presence of branched caudal-fin rays readily separates *D. crossotus* from these three Pacific species wherein caudal-fin rays are never branched.

Remarks.—The brownish spot on the eye is usually distinct in material from Brazil and most Caribbean collections. It is absent in specimens examined from Anguilla, St. Martin, Barbados, and most Bahama collections, whereas the spot is variously present or absent in specimens from Florida.

Among examined material, the smallest transformed male was 38.9 mm SL, the smallest ovigerous female was 33.8 mm SL; 207 ovarian eggs were counted from a 51 mm SL female.

Distribution.—Literature records and materials examined show *D. crossotus* to occur in southeastern Florida (ca. 27°N) and the Bahamas, in the Antilles from Cuba to Barbados, and along the Brazilian coast from Natal to Ubatuba, State of São Paulo (ca. 24°S). The species is best represented in samples from the Bahamas and Brazil, it occurs infrequently in the Antilles, and is absent from collections in the Gulf of Mexico and from mainland or insular localities along western shores north of Natal, Brazil. Distribution is unusual and locally restricted in southeastern Florida where *D. crossotus* has been taken with *D. tridigitatus, D. moorei,* and *Gillellus greyae* from the vicinity of Fort Pierce (St. Lucie Co.) south to the Fort Lauderdale area (Broward Co.). *Dactyloscopus crossotus* has not been taken elsewhere in southern Florida, although the three associated species are common in collections southward to Key West and the Dry Tortugas (Monroe Co.).

Thirty-one of 33 samples with acceptable data were taken in 0–2.5 m and there are SCUBA collections from 3.7 and 7.6 m.

Material Examined.—983 specimens, 18.8–62.8 mm SL, including holotype.

Holotype.—CAS-SU 22227 (43.8 mm SL male), Brazil, Natal, tidepool, 1911, E. C. Starks.

Other Material.—UNITED STATES, East Florida, St. Lucie Co.: HBF 107-1724 (1, 23.1). Martin Co.: FSU 12234 (1, 30.8), FSU 12247 (2, 34.4–38.1), FSU 12248 (5, 32.5–37.0), USNM 221444 (1, 22.0). Palm Beach Co.: FAU 68-3 (68, 25.8–53.0), FAU 68-4 (1, 39.8), FAU 69-1 (18, 43.2–53.2), FSU 2573 (2, 48.7–52.0), UMML 33318 (20, 29.5–46.1). Broward Co.: UMML 33319 (1, 35.1), UMMZ 108033 (1, 47.6), UMMZ 139321 (2, 46.8–51.3). BAHAMA IS.: ANSP 75227 (1, 47.1), ANSP 110385 (2, 31.0–46.8), ANSP 110387 (2, 46.8–50.0), ANSP 110388 (1, 34.3), ANSP 110389 (37, 22.0–42.0), ANSP 110390 (2, 41.0–42.2), ANSP 110391 (43, 28.4–50.6), ANSP 110392 (2, 29.3–44.7), ANSP 110393 (1, 46.4), ANSP 110394 (2, 43.0–43.4), ANSP 110395 (2, 51.7–62.8), ANSP 110396 (11, 33.0–60.5), ANSP 110397 (69, 22.4–54.0), ANSP 110398 (2, 40.1–44.5), ANSP 110399 (12, 32.3–50.0), ANSP 110400 (90, 21.5–53.0), ANSP 110401 (205, 21.9–52.0), ANSP 110402 (68, 26.0–45.2), ANSP 110403 (118, 18.8–47.1), ANSP 111671 (1, 40.5), ANSP 113285 (2, 32.4–45.7), ANSP 116537 (1, 32.6), ANSP 117878 (1, 38.0), ANSP 122927 (39, 26.1–50.0), ANSP 126655 (2, 47.5–55.1), ANSP 144119 (1, 49.9), FSM 8809 (3, 32.2–36.2), FSM 27511 (26, 33.2–42.7), GCRL 16899 (5, 49.4–51.8, cleared and stained), UMML 33320 (2, 46.5–59.5). GREATER ANTILLES, Cuba: UMML 33321 (2, 28.8–29.9). Jamaica: LACM 5938 (1, 22.8). Puerto Rico: LACM 6721-4 (5, 29.3–34.6). LESSER ANTILLES, Anguilla: ANSP 116555 (1, 54.2). St. Martin: UMML 5295 (2, 37.9–39.2), UMML 5718 (4, 28.4–36.1). St. Barthelemy: ANSP 116541 (3, 46.6–52.0). Antigua: USNM 178894 (1, 40.4). Dominica: USNM 221443 (1, 31.3). St. Lucia: ANSP 116540 (1, 40.1). Barbados: ANSP 107650 (1, 27.4). BRAZIL, Rio Grande do Norte: AMNH 3761 (1, 39.8), CAS-SU 22522 (7, 30.6–41.0). Pernambuco: GCRL 13772 (1, 31.5), MZUSP uncat. (2, 20.7–33.8). Bahia: ANSP 122932 (15, 23.8–51.5), GCRL 9887 (34, 23.3–51.4), GCRL 10706 (1, 31.1), GCRL 10707 (16, 19.2–43.9), GCRL 11157 (2, 32.9–38.4, cleared and stained). Rio de Janeiro: MNI 9404 (52.7, holotype of *Paramyxodagnus mangaratibensis*), MNI 9406 (39.5, holotype of *Springeria santosi*), MNI 9770 (40.1, holotype of *Paramyxodagnus moreirai*), MZUSP uncat. (1, 45.6). São Paulo: GCRL 10704 (1, 27.8).

Dactyloscopus tridigitatus Gill
Figure 8

Dactyloscopus tridigitatus Gill, 1859:132 (original description, Barbados).
Dactyloscopus (*Dactyloscopus*) *tridigitatus*. Jordan and Evermann, 1896:465 (new combination).

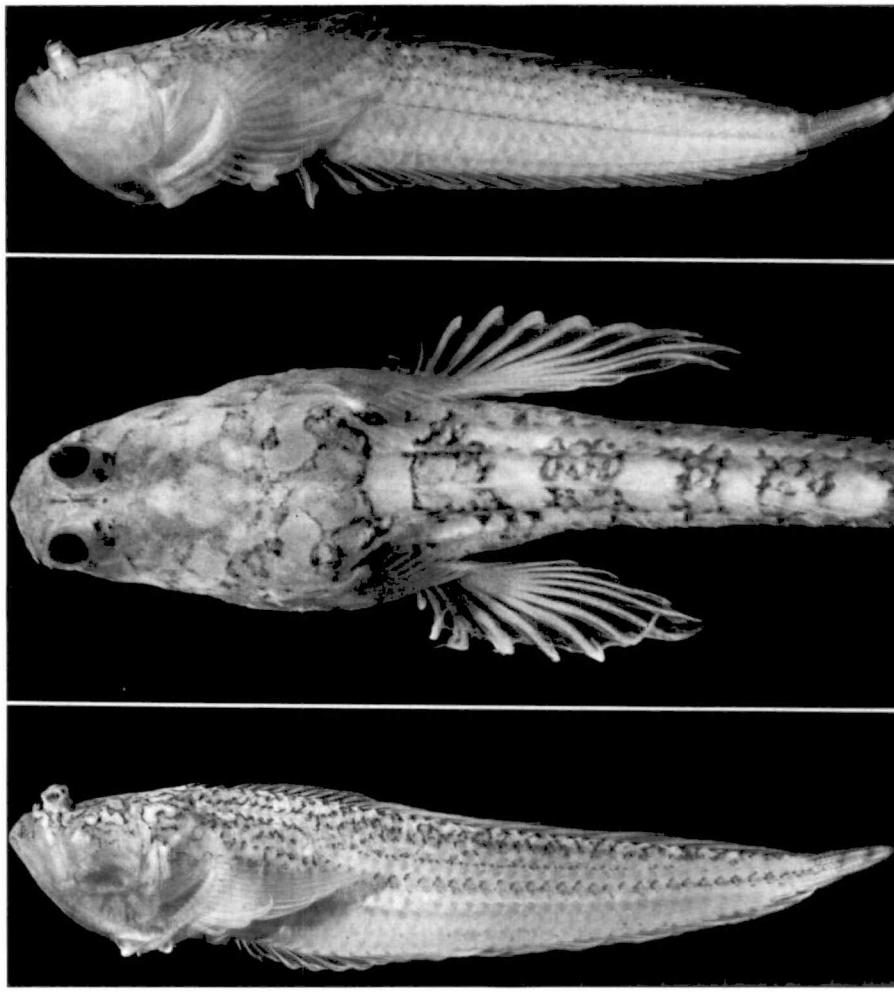


Figure 8. *Dactyloscopus tridigitatus* Gill. Top and middle: Transformed male (55.0 mm SL), GCRL 14801. Bottom: Adult female (61.4 mm SL), ANSP 116546.

Cokeridia kathetostoma Carvalho, 1957:2, pl. 1, fig. 1 (original description; Ilha de São Sebastião, State of São Paulo, Brazil).

Dactyloscopus kathetostomus. Miller and Briggs, 1962:8 (new combination).

Paragillellus macropoma Carvalho and Pinto, 1965:112, figs. 8–9 (original description; Ilha Grande, State of Rio de Janeiro, Brazil).

Tamandareia oliveirai Carvalho and Pinto, 1965:115, figs. 11–13 (original description; Baia de Tamandaré, State of Pernambuco, Brazil).

Diagnosis.—Posterior naris on anterior rim of preorbital (Fig. 3a); last lateral-line scale the terminal scale on lower part of caudal-fin base; a distinct notch in ventral margin of caudal peduncle or caudal-fin base; diameter of pigmented eye less than height of extended eyestalk; eye with or without distal spot; dorsal fin usually discontinuous; total dorsal-fin rays usually 39–41; preopercular canal pores 11 or less; modally 15 scales in lateral-line arch; premaxillary pedicel reaches past posterior margin of orbit.

Description.—The deteriorated condition of syntypes precludes detailed measurements.

See Tables 1–16 for meristic data.

Anterior profile obtusely triangular to broadly rounded in dorsal aspect (Fig. 8). Dorsal fin infrequently continuous, usually with 2–4 free anterior spines, 3 in 78% of specimens examined (Table 3); adults with 6–8 branched caudal-fin rays (Table 1); preopercular canal pores 7 or less in 95% of specimens examined; eyestalk long and slender, height greater than orbit diameter, about twice diameter of pigmented eye.

Scales above lateral-line arch in 2–3 rows below 1st–2nd dorsal spine, usually in 1.5–2 rows above apex of arch; last lateral-line scale, the terminal scale on lower part of caudal-fin base, with canal directed ventrally and overlying a distinct notch in ventral margin at rear of caudal peduncle (Fig. 4c); longitudinal scale rows usually 4 + 1 + 4–5. Pseudobranchiae 6–9 (three specimens examined); premaxillary pedicel usually extends a third or more of orbit diameter beyond rear margin of orbit.

Coloration.—Often light tan or pale, without persistent markings, except for blackish eyes. Well-pigmented fish (Fig. 8) with dorsum and dorsolateral portions of head blotched or mottled with tan; 11–14 irregular brownish bars cross dorsum between nape and caudal-fin base; upper part of side variously flecked with brown, often with faint brownish stripe along straight portion of lateral line; caudal fin plain or with 2–3 faint brown bars; typically without oral pigmentation.

Comparisons.—*Dactyloscopus tridigitatus* is the only Atlantic species wherein the last lateral-line scale is the terminal scale on the lower part of the caudal-fin base. Although best developed in *D. tridigitatus,* the notch in the ventral margin of the peduncle or caudal-fin base is shared with *D. crossotus, D. boehlkei* and *D. foraminosus,* but only the latter two species and *D. tridigitatus* have the posterior naris located on the preorbital rim. Compared to these two species, *D. tridigitatus* has the longest eyestalks, usually lacks the continuous dorsal fin characteristic of *D. boehlkei,* and has lower average numbers of preopercular canal pores (5 against 9 and 54) and opercular fimbriae (12 against 17 and 19). The combination of long eyestalk, notched caudal peduncle and terminal position of last lateral-line scale permits ready separation of *D. tridigitatus* from Atlantic congeners. The preorbital rim location of the posterior naris, notched peduncle and terminal position of last lateral-line scale constitutes a character combination also shared with two Pacific species (*D. byersi, D. pectoralis*), but these species typically lack the branched caudal-fin rays occurring in *D. tridigitatus* and have modally 16–17, rather than 15, scales in the lateral-line arch.

Remarks.—The syntypes (USNM 6307) consist of three damaged adults (apparently females) in very poor condition; one lacks the head and portions of the body, the others measure 64 and 74.5 mm SL. The two whole specimens have elongate eyestalks, long premaxillary pedicels, posterior naris located on rim of preorbital and, respectively, 6 and 7 pores in the 1st preopercular canal. Scales are mostly lost but the ventral notch is present at rear of caudal peduncle in the largest fish, as well as in the headless body; the peduncle is damaged in the 64 mm specimen. The following counts were obtained from the 74.5 mm SL syntype: dorsal spines 12, segmented dorsal-fin rays 28, segmented anal-fin rays 28, pectoral-fin rays 13 × 13, opercular fimbriae 15 × 14, upper lip fimbriae 13.

The pale to brownish eyespot is variably present in specimens in some collections from Brazil and the Lesser Antilles (e.g. St. Barthelemy, Dominica, Grenadine Is.), but it has not been noted in specimens from other areas.

Among materials examined, the smallest transformed male was 39.3 mm SL

and one 38 mm female had well-developed gonads; most fish mature at lengths of 45 mm or longer.

Distribution.—This is one of the more abundant and widely distributed Atlantic dactyloscopids. It ranges from the vicinity of Fort Pierce, southeastern Florida (ca. 27°N), to Ubatuba, State of São Paulo, Brazil (ca. 24°S). There are no confirmed records from the Gulf of Mexico (north of the Florida Keys), but the species is well represented in the Bahamas and Antilles, on western Caribbean shores from Quintana Roo, México to Venezuela, and in Brazil (Fernando de Noronha; Natal to Ubatuba).

Kanazawa (1952) reported *D. tridigitatus* from Bermuda on the basis of two adult specimens reportedly dredged in Castle Harbor on 20 June 1908 by L. L. Mowbray; another lot (FMNH 48664) is labeled "Bermuda (?), L. L. Mowbray." It is known that Mowbray also collected in the Bahamas (Turk I.), that he obtained specimens from a number of sources, and that his shipments of specimens to mainland museums were not always accompanied by adequate data. In the absence of other collections, I question the occurrence of *D. tridigitatus* at Bermuda.

Among 125 samples with acceptable data, 33 are recorded from 0–1 m, 63 from 0–2.5 m, 27 from 0–10 m and there are two SCUBA collections in 15.2 and 29.0 m.

Material Examined.—3,097 specimens, 11.3–74.5 mm SL, including three syntypes.

Syntypes.—USNM 6307 (3, one without head and two others 64.0–74.5 mm SL), Barbados, T. Gill.

Other Material.—BERMUDA (?): FMNH 48707 (2, 52.8–62.2). UNITED STATES, East Florida, St. Lucie Co.: HBF 107-1781 (3, 23.8–45.2). Martin Co.: FSU 12052 (5, 33.6–46.0), FSU 12055 (2, 31.6–45.9), HBF 107-0154 (5, 36.1–48.6). Palm Beach Co.: FAU 68-1 (1, 45.3), FAU 68-3 (1, 42.5), FAU 69-1 (2, 39.0–49.8), FSU 11282 (1, 45.3). Dade Co.: UMML 9922 (8, 33.5–59.6), UMML 11929 (1, 18.0), UMML 33349 (1, 13.6), UMMZ 189758 (1, 43.7), USNM 125489 (1, 37.4). Monroe Co.: FAU F.114 (1, 30.3), FSM 10864 (2, 11.3–38.7), FSM 11014 (1, 43.2), FSM 16176 (22, 19.9–54.4), UMML 2564 (1, 45.3), UMML 6422 (1, 37.7), UMML 6635 (2, 39.4–44.2), UMML 7281 (2, 32.9–42.9), UMML 10778 (4, 23.9–39.3), UMML 17285 (1, 45.2), UMML 18094 (1, 48.4), UMML 18152 (1, 20.2), UMML 18946 (1, 33.1), UMML 19069 (1, 32.9), UMML 19300 (2, 28.0–32.2), UMML 19323 (1, 40.2), UMML 19617 (16, 23.6–49.4), UMML 19683 (1, 43.8), UMML 20019 (1, 22.4), UMML 20280 (9, 34.1–46.1), UMML 33322 (2, 12.3–13.6), UMMZ 205396 (1, 38.4), UMMZ 205397 (64, 24.5–53.8), USNM 6310 (1, 52.8), USNM 57442 (1, 52.5), USNM 221448 (1, 21.0). BAHAMA IS.: AMNH 7394 (20, 37.9–69.1), AMNH 7395 (2, 62.4–63.2), AMNH 17934 (1, 40.0), AMNH 19595 (2, 55.1–55.6), AMNH 19851 (1, 52.1), AMNH 22946 (1, 27.2), AMNH 23057 (6, 25.1–40.7), AMNH 24016 (2, 15.9–16.4), AMNH 24092 (1, 42.1), AMNH 24133 (2, 15.5–25.6), AMNH 24184 (2, 27.7–33.3), AMNH 24719 (4, 24.8–58.2), AMNH 25994 (4, 24.1–27.0), AMNH 26126 (17, 18.6–37.7), AMNH 27369 (3, 32.4–53.5), AMNH 27530 (6, 17.9–43.8), AMNH 28413 (1, 44.0), AMNH 28474 (2, 25.7–42.7), AMNH 28498 (2, 24.4–39.3), AMNH 29031 (2, 25.9–30.5), AMNH 29046 (1, 18.8), AMNH 29091 (2, 17.3–20.2), AMNH 30034 (9, 24.6–54.0), AMNH 30788 (1, 38.1), AMNH 31148 (9, 30.4–45.4), AMNH 34009 (2, 15.5–18.9), AMNH 34042 (6, 21.3–23.5), AMNH 34133 (1, 45.6), AMNH 34219 (4, 16.7–34.3), AMNH 34690 (5, 22.9–34.5), ANSP 72184 (4, 33.7–54.5), ANSP 72221 (1, 55.4), ANSP 72222 (1, 30.1), ANSP 100507 (45, 19.7–53.6), ANSP 110153 (2, 42.6–42.8), ANSP 110154 (1, 49.6), ANSP 110155 (3, 34.6–36.1), ANSP 110156 (1, 36.8), ANSP 110157 (2, 51.6–56.2), ANSP 110158 (1, 27.2), ANSP 110159 (2, 32.3–49.7), ANSP 110160 (13, 48.3–58.2), ANSP 110161 (1, 26.1), ANSP 110162 (3, 26.1–46.1), ANSP 110163 (11, 18.9–59.0), ANSP 110164 (2, 22.2–43.4), ANSP 110165 (15, 15.6–55.5), ANSP 110166 (3, 51.2–55.1), ANSP 110167 (1, 48.2), ANSP 110168 (6, 29.6–42.1), ANSP 110169 (2, 29.4–29.9), ANSP 110170 (3, 20.8–55.8), ANSP 110171 (8, 22.2–43.6), ANSP 110172 (2, 46.5–61.5), ANSP 110173 (23, 27.0–54.6), ANSP 110174 (38, 15.7–57.1), ANSP 110175 (8, 43.0–55.8), ANSP 110176 (10, 19.8–41.6), ANSP 110177 (2, 40.4–48.3), ANSP 110178 (3, 45.7–52.2), ANSP 110179 (21, 21.6–62.2), ANSP 110180 (13, 25.5–56.0), ANSP 110181 (6, 36.4–48.3), ANSP 110182 (4, 51.3–57.6), ANSP 110183 (2, 37.4–45.9), ANSP 110184 (2, 36.2–48.3), ANSP 110185 (3, 25.7–28.0), ANSP 110186 (7, 18.5–46.5), ANSP 110187 (46, 16.2–46.6), ANSP 110188 (116, 17.5–47.2), ANSP 110189 (4, 27.1–36.1), ANSP 110190 (1, 57.5), ANSP 110192 (1, 44.6), ANSP 110193 (7, 32.0–44.9), ANSP 110194 (5, 27.3–45.3), ANSP 110195 (1, 45.6), ANSP 110196 (6, 34.3–66.0), ANSP 110374 (50, 14.2–48.6), ANSP 110375 (66, 17.5–

40.4), ANSP 110376 (26, 28.8–55.4), ANSP 110377 (53, 18.3–61.1), ANSP 110378 (25, 21.2–53.3), ANSP 110379 (1, 49.0), ANSP 110380 (12, 23.9–46.3), ANSP 110381 (4, 24.0–45.7), ANSP 110382 (82, 16.2–52.4), ANSP 110383 (229, 17.0–54.7), ANSP 110386 (5, 12.7–15.2), ANSP 111672 (1, 71.2), ANSP 116311 (1, 63.4), ANSP 116538 (435, 14.3–58.3), ANSP 117879 (1, 47.8), ANSP 119795 (8, 48.5–57.5), ANSP 122926 (16, 17.1–41.2), ANSP 126657 (4, 20.9–30.8), ANSP 126658 (2, 20.7–24.3), ANSP 126659 (22, 19.0–45.0), ANSP 126660 (1, 57.3), ANSP 126661 (8, 24.7–38.0), ANSP 144229 (1, 13.0), ANSP 144230 (3, 21.2–22.8), FAU 68-5 (2, 37.7–49.6), FMNH 48845 (1, 70.6), FSM 8807 (1, 39.1), FSM 8808 (1, 46.3), FSM 9579 (9, 48.6–56.8), FSM 13377 (19, 27.4–59.7), FSM 17552 (5, 30.2–50.4), FSM 18670 (1, 36.6), GCRL 16897 (5, 50.8–54.5, cleared and stained), UMML 6094 (206, 15.4–54.1), UMML 6378 (1, 19.0), UMML 8547 (8, 28.6–45.9), UMML 8551 (23, 13.2–27.7), UMML 12878 (4, 20.3–38.3), UNC 4922 (3, 17.1–39.3), USNM 53215 (2, 26.2–27.7). GREATER ANTILLES, Cuba: USNM 82550 (1, 22.2), USNM 133014 (20, 41.4–63.2). Cayman Is.: BMNH 1939.5.12.194 (1, 34.3), FSM 12348 (1, 20.3), FSM 17040 (1, 58.5). Jamaica: LACM 5934 (1, 55.0), LACM 5935 (37, 23.4–60.3), LACM 5936 (5, 43.3–64.1), LACM 5937 (3, 31.9–43.8), LACM 5940 (1, 43.1), LACM 39300-1 (13, 23.9–44.0), LACM 39301-1 (1, 57.0), LACM 39302-1 (2, 40.4–56.5), LACM 39303-1 (8, 38.8–48.0). Puerto Rico: ANSP 115664 (1, 49.1), FMNH 3317 (1, 60.2), FMNH 83920 (15, 39.8–71.6), LACM 7797 (1, 40.7), LACM 7819 (1, 57.3), UMML 10325 (2, 31.0–33.2), UMMZ 172688 (1, 60.7), USNM 221446 (13, 28.1–63.3). LESSER ANTILLES, Virgin Is.: ANSP 107651 (20, 26.7–63.1), ANSP 108839 (1, 37.0), ANSP 108840 (5, 29.7–53.2), ANSP 108841 (12, 24.9–56.7), BMNH 1976.7.15.174 (1, 26.6), BMNH 1976.7.15.175-200 (27, 21.0–56.3), GCRL 1918 (1, 60.8), UMML 5266 (1, 27.8), UMML 33323 (1, 38.0), UMML 33324 (13, 24.5–66.3), UMML 33325 (13, 21.7–55.7). Anguilla: ANSP 116551 (66, 21.5–53.9), USNM 183850 (1, 35.8), USNM 183581 (1, 34.9). St. Martin: ANSP 116546 (34, 18.7–61.3), UMML 5720 (4, 20.0–35.0), UMML 6485 (15, 19.8–47.9). St. Barthelemy: ANSP 116542 (3, 22.1–32.4), ANSP 116550 (21, 22.1–36.4). Antigua: FSM 11942 (21, 12.2–58.4). Isla Aves: UMML 31744 (8, 28.6–42.5), USNM 221445 (1, 38.7). Dominica: USNM 198271 (9, 33.7–66.5). Martinique: ANSP 116547 (2, 16.6–34.5), UMML 33326 (1, 39.0), UMML 33327 (6, 29.7–47.5). St. Lucia: ANSP 116539 (2, 18.5–32.8), ANSP 116554 (53, 17.7–64.2), USNM 170158 (1, 60.0). St. Vincent: ANSP 116545 (2, 26.6–40.7). Barbados: ANSP 107648 (1, 36.5), ANSP 107649 (1, 60.1), BMNH 1922.3.26.11-12 (2, 64.3–68.0), CAS-SU 37264 (4, 38.5–65.2), CAS-SU 37265 (1, 39.6), USNM 120132 (1, 52.3). Grenadine Is.: AMNH 17386 (3, 39.4–49.4), ANSP 116548 (9, 40.9–54.0), ANSP 116549 (7, 17.1–40.3), ANSP 116552 (56, 25.9–48.8), ANSP 116553 (68, 25.4–69.5), USNM 178392 (1, 52.2). Grenada: ANSP 116543 (8, 32.7–64.1), ANSP 116544 (15, 24.3–45.5), USNM 86753 (1, 27.2). Tobago: ANSP 107644 (1, 46.5). Curaçao: RMNH 9779 (1, 53.2), ZMA 114.166 (2, 59.3–67.0). MÉXICO, Quintana Roo: GCRL 3009 (11, 32.6–58.1), UMML 9715 (1, 47.2), MPM 11505 (1, 37.8). BELIZE: FMNH 80471 (1, 67.7), FMNH 83919 (2, 44.0–46.0), UMML 9489 (2, 19.7–43.4). HONDURAS: ANSP 120599 (2, 30.5–43.1), ANSP 120600 (8, 39.2–51.1), ANSP 120601 (16, 31.9–57.0). NICARAGUA, Great Corn I.: CNP 76-120 (10, 42.4–59.0), GCRL 14801 (6, 41.2–56.0). PROVIDENCIA I.: FSM 18846 (9, 24.8–40.4), FSM 18888 (1, 48.5), FSM 23473 (1, 35.0), FSM 19909 (1, 57.2), FSM 19037 (1, 52.3), FSM 24465 (3, 14.8–27.9), FSM 24469 (3, 19.6–33.6), FSM 24472 (2, 40.1–40.7), FSM 24476 (3, 38.7–40.3). PANAMÁ: GCRL 10225 (5, 53.8–59.0), GCRL 10731 (1, 62.2), LACM 31051-9 (17, 27.8–63.8), MCZ 45493 (26, 41.7–59.4), MCZ 47613 (11, 24.1–57.0), MCZ 47584 (1, 51.7), MCZ 52016 (2, 35.6), SIO 67-45 (8, 28.0–51.3). COLOMBIA: GCRL 7969 (6, 54.0–64.7), USNM 206555 (25, 44.5–62.4). VENEZUELA: ANSP 120572 (2, 39.0–50.7). BRAZIL, Fernando de Noronha: GCRL 16898 (5, 33.7–44.8), USNM 221447 (12, 18.8–49.1). Rio Grande do Norte: AMNH 3771 (4, 40.0–45.5), CAS-SU 22155 (11, 24.0–62.0). Pernambuco: MNI 9218 (43.8, holotype of *Tamandareia oliveirai*). Alagoas: FSM 19951 (1, 26.1), GCRL 12304 (1, 31.6), GCRL 12305 (1, 46.5), MZUSP uncat. (2, 17.2–56.5). Bahia: ANSP 122933 (5, 25.8–58.6), ANSP 122934 (5, 31.8–56.6), FSM 19244 (1, 59.5), GCRL 9380 (2, 40.0–43.2), GCRL 10708 (6, 14.7–49.0), GCRL 10709 (26, 32.6–59.6), GCRL 11085 (5, 41.5–62.0), GCRL 11086 (1, 36.8), GCRL 11087 (8, 34.0–66.4), GCRL 11088 (9, 33.6–56.7). Rio de Janeiro: MNI 9772 (41.8, holotype of *Paragillellus macropoma*). São Paulo: GCRL 10705 (1, 55.7), GCRL 14646 (1, 26.2), MNI 9783 (63.2, holotype of *Cokeridia kathetostoma*). LOC. UNCERTAIN: BMNH 1852.9.13.63 (3, 39.1–54.4), Caribbean Sea, no other data; FMNH 48664 (4, 44.0–68.2), Bermuda (?), L. L. Mowbray.

Dactyloscopus boehlkei new species
Figure 9

Dactyloscopus poeyi (not of Gill). Böhlke and Chaplin, 1968:497, fig. (brief description; Bahamas).

Diagnosis.—Posterior naris on anterior rim of preorbital (Fig. 3a); last lateral-line scale the penultimate scale on lower part of caudal-fin base; typically with notch in ventral margin of caudal-fin base; diameter of pigmented eye equals or exceeds height of extended eyestalk; eye usually with distal spot or dermal protrusion;

dorsal fin usually continuous; total dorsal-fin rays usually 40–41; canal pores 16 or less; modally 16 scales in lateral-line arch; premaxillary pedicel reaches past rear margin of orbit.

Description.—Measurements (mm) of 42.3 mm SL, immature male, holotype follow: caudal-fin length 5.1, lengths of upper and lower segmented caudal-fin rays 4.9, depth of caudal peduncle 2.3, body depth 7.5, predorsal length 9.1, preanal length 12.6, head length 10.0, head breadth 6.9, maxillary to upper opercular angle 9.1, maxillary to upper preopercular angle 7.4, diameter of bony orbit 1.9, height of eye 1.2, postorbital length 6.6, upper jaw length 4.5.

See Tables 1–16 for meristic data.

Anterior profile broadly rounded in dorsal aspect (Fig. 9). Dorsal fin usually continuous, the anterior membranes incised but typically without free anterior spines (Table 3); adults with 6–8 branched caudal-fin rays (Table 1); preopercular canal pores 6–13 in 95% of specimens examined; opercular fimbriae average 17.4; lower lip fimbriae average 24.5; eyestalk not slender and elongate, height usually 30–50% less than orbit diameter; eye typically with a translucent mesial spot or bump-like protrusion on the otherwise smooth distal surface.

Scales usually in two rows between lateral-line arch and 1st–2nd dorsal spines, a single posterior row above remainder of arch; last lateral-line scale, the penultimate scale on lower part of caudal-fin base, with canal angled ventrally and distal pore opening above slight notch in ventral margin near vertical through rear of hypural (Fig. 4a); longitudinal scale rows 4 + 1 + 4. Pseudobranchiae 6–7 (two specimens examined); premaxillary pedicel usually reaches well beyond posterior margin of orbit.

Coloration.—Pale to light tan, some with faint traces of brown on dorsum but without prominent persistent markings; eye blackish; without oral pigmentation.

Etymology.—Named *boehlkei* after James E. Böhlke, Curator of Fishes (ANSP), in recognition of his contributions to our knowledge of Atlantic dactyloscopids.

Comparisons.—Among Atlantic congeners, *D. boehlkei* shares posterior naris location on preorbital rim and notch in ventral margin of tail with *D. tridigitatus* and *D. foraminosus*. It lacks the elongate eyestalk of *D. tridigitatus* and further differs from that species in having a small notch below rear of hypural (notch larger, usually before rear of hypural in *tridigitatus*) and in that the last lateral-line scale is the penultimate scale on caudal-fin base rather than the terminal scale as in *D. tridigitatus*. *Dactyloscopus boehlkei* shares the short eyestalk and position of the last lateral-line scale with *D. foraminosus* but differs in lower counts of preopercular canal pores (6–16 against 23–90), segmented anal-fin rays (32–33 against 33–34) and vertebrae (32–34 against 33–35). It apparently fails to reach the large size of *D. foraminosus* (max. SL, 55 mm against at least 74 mm) and lacks the persistent coloration of that species (Figs. 9 and 10). Compared to other Atlantic congeners, *D. boehlkei* differs from *D. crossotus* in posterior naris location (Fig. 3a against 3b) and from the remaining species in position of the last lateral-line scale (Fig. 4a against 4b).

Remarks.—Böhlke and Chaplin (1968) provisionally referred this species to *D. poeyi* but it is highly unlikely that *D. boehlkei* is conspecific with the specimen described by Gill (1861). The unique Cuban holotype (now lost) was described as being similar to *D. tridigitatus* in body form, as having persistent color markings and a total length of 2.6 inches (66 mm). The body form of *D. boehlkei* is not similar to that of *D. tridigitatus* (Figs. 8 and 9), color markings (if any) are not persistent and the largest known specimen has a total length of 59.4 mm.

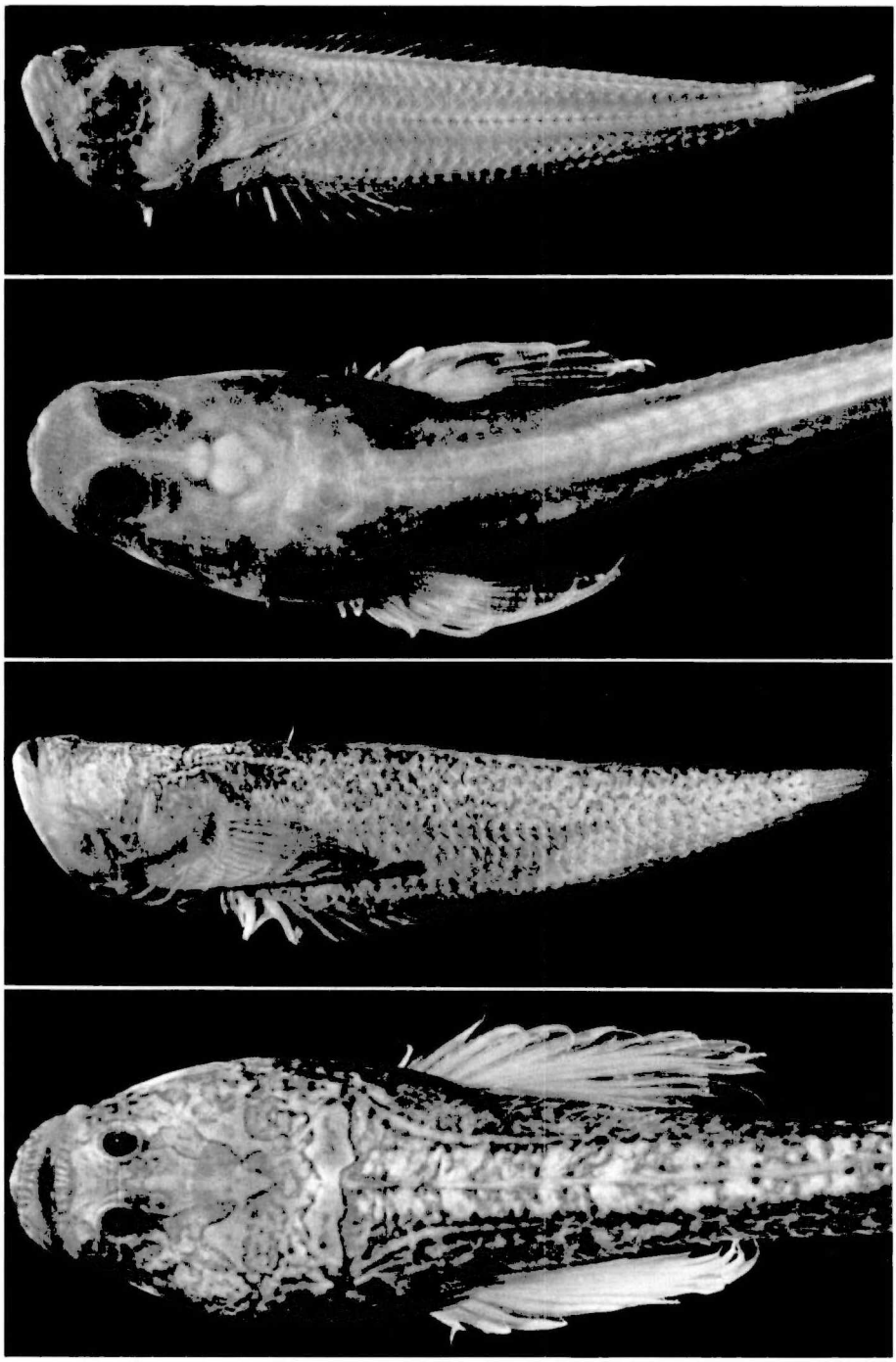


Figure 9. Upper pair: *Dactyloscopus boehlkei* n. sp. GCRL 16925 (40.4 mm SL, female, paratype). Lower pair: *Dactyloscopus foraminosus* n. sp. USNM 221437 (71.0 mm SL, transformed male, holotype).

Furthermore, *D. boehlkei* is relatively uncommon in collections and is presently known only from the Bahamas; see under *D. poeyi* for further remarks.

The notch in the ventral margin of the caudal-fin base is small and may be concealed beneath the lowermost part of the last lateral-line scale. It is best seen with transmitted light but the notch is usually less obvious than in either *D. tridigitatus* or *D. crossotus*.

There are few transformed males in the study material, the smallest is 36.4 mm SL; immature eggs were noted in a 29.3 mm SL female.

This species has been taken with *D. poeyi* and *D. comptus*.

Distribution.—*Dactyloscopus boehlkei* is known only from the Bahama Is. Seven collections are from 0–2.4 m, one is from 4.6–7.6 m.

Material Examined.—Holotype and 57 paratypes, 21.7–55.3 mm SL.

Holotype.—ANSP 144087 (42.3 mm SL, young male), Bahama Is., Rose I., sand beach on N shore, 0–27.4 m offshore, depth 0–1.2 m, Sta. 702, 25 Aug. 1972, J. E. Böhlke and party.

Paratypes.—BAHAMA Is., Rose I.: ANSP 116461 (4, 25.9–28.8), N shore near W end, sand bottom with some rock, 0–2.4 m, Sta. 636, 12 Aug. 1969, J. E. Böhlke and party. ANSP 144088 (13, 32.4–46.7), GCRL 16923 (2, 46.9–55.3, cleared and stained), GCRL 16924 (4, 40.8–47.3) and USNM 221434 (2, 42.6–43.5), taken with holotype. Hog I.: ANSP 110439 (2, 29.2–32.1), N shore, Cabbage Beach, fine white sand, 0–1.4 m, Sta. 215, 14 Apr. 1955, C. C. G. Chaplin and J. E. Böhlke. ANSP 110442 (3, 36.8–41.9), ANSP 111670 (1, 41.8), ANSP 117880 (1, 38.9) and GCRL 16925 (1, 40.4), N shore, sand, 0–1.5 m, Sta. 244, 6 Aug. 1955, J. C. Briggs and J. E. Böhlke. ANSP 110441 (13, 21.7–35.5), N shore, Cabbage Beach, sand, 0–1.8 m, Sta. 286, 25 Apr. 1956, C. C. G. Chaplin and party. Andros I.: ANSP 110440 (6, 29.3–50.5) and USNM 221435 (3, 34.1–36.3), W side of southern Long Bay Cay, sand and *Thalassia*, 0–1.2 m, Sta. 396, 12 July 1957, C. C. G. Chaplin and party. Crooked I.: ANSP 144089 (1, 22.9), Pittstown Point, sand, 0–2.1 m, Sta. 586, 1 June 1962, C. C. G. Chaplin and party. West Plana Cay: AMNH 29090 (1, 26.3), sand, 4.6–7.6 m, Sta. S66-35c, 21 Mar. 1966, C. L. Smith.

Dactyloscopus foraminosus new species
Figure 9

Diagnosis.—Posterior naris on anterior rim of preorbital (Fig. 3a); last lateral-line scale the penultimate scale on lower part of caudal-fin base; with notch in ventral margin of caudal-fin base; diameter of pigmented eye equals or exceeds height of extended eyestalk; eye with distal spot; dorsal-fin usually discontinuous; total dorsal-fin rays usually 41–42; preopercular canal pores more than 20 in adults; modally 16 scales in lateral-line arch; premaxillary pedicel reaches past rear margin of orbit.

Description.—Measurements (mm) of 71.0 mm SL, transformed male, holotype follow: caudal-fin length 7.8, length of uppermost segmented caudal-fin ray 7.3, length of lowermost segmented caudal-fin ray 6.1, depth of caudal peduncle 3.6, body depth 13.3, predorsal length 14.2, preanal length 20.5, head length 15.9, head breadth 11.5, maxillary to upper opercular angle 14.2, maxillary to upper preopercular angle 10.4, diameter of bony orbit 2.3, height of eye 1.3, postorbital length 10.8, upper jaw length 6.6.

See Tables 2–16 for meristic data.

Anterior profile broadly rounded in dorsal aspect (Fig. 9). Dorsal fin sometimes continuous, usually with 1–4 free anterior spines (Table 3); adults with 6–8 branched caudal-fin rays; preopercular canal pores numerous, 21–90 in study material, usually 34 or more in adults; eyestalk not slender and elongate, height usually 50–60% less than diameter of orbit.

Scales usually in three rows between lateral-line arch and 1st–2nd dorsal spines, reduced to a single row above remainder of arch. Last lateral-line scale, the

penultimate scale on lower part of caudal-fin base, with canal angled ventrally and distal pore opening above slight notch in ventral margin near vertical through rear of hypural (Fig. 4a); longitudinal scale rows 4–5 + 1 + 4–5. Pseudobranchiae 7–8 (two specimens examined); premaxillary pedicel long, reaches about half of orbit diameter beyond posterior rim of orbit.

Coloration.—Ground color light tan to pale, markings brown. Dorsum and dorsolateral portion of head blotched and irregularly barred with brown (Fig. 9); dorsum of body with 10 or more irregular brownish bars between nape and caudal-fin base; upper half or more of sides flecked with brown; eye blackish, with dark brown mesiodistal spot; oral pigmentation well developed.

Etymology.—Named *foraminosus,* full of holes, in allusion to the numerous pores in the 1st preopercular canal of adults.

Comparisons.—Among Atlantic congeners, only *D. foraminosus* and *D. boehlkei* share the combination of posterior naris location on preorbital rim, short eyestalk, penultimate location of the last lateral-line scale, and presence of a notch in the ventral margin of the caudal-fin base. *Dactyloscopus foraminosus* differs from *D. boehlkei* in having higher counts of preopercular canal pores (21–90 against 6–16), total dorsal-fin rays (40–42 against 39–41), segmented anal-fin rays (33–34 against 32–33), caudal vertebrae (33–35 against 32–34) and in other meristic features (Tables 2–16). Furthermore, *D. foraminosus* has well-developed persistent coloration which is lacking in *D. boehlkei* (Fig. 9) and evidently attains a much larger size (at least 74 mm SL against 55.3 mm in largest known *boehlkei*). These two species are closely related and, when adequate material becomes available, may prove to be only subspecifically distinct.

Frequency of preopercular canal pores is alone sufficient to separate adult *D. foraminosus* from all Atlantic congeners except *D. poeyi.* These species differ in orientation and position of the last lateral-line scale (Fig. 4a against 4b for *poeyi*), and *D. foraminosus* usually has fewer dorsal spines (modally 10 against 12–13 in *poeyi*).

Remarks.—Three damaged specimens (not paratypes) taken off southeastern Florida are provisionally referred to this species, pending collection of undamaged comparative Florida material. These fish agree with *D. foraminosus* in character of the eye, and in posterior naris location. They also have high counts of preopercular canal pores (22–39), agree in other meristic features and have similar persistent coloration. Uncertainty exists in the configuration of scales on the caudal-fin base and squamation above the lateral-line arch. One of these specimens (ANSP 70832) was reported as *D. tridigitatus* by Fowler (1941).

The majority of the type material was taken during R/V OREGON II Cruise 58 off the mouth of the Amazon River. Collette and Rützler (1977) discuss general features and zoogeographical significance of collections from this cruise.

Among type material, two specimens (41–44 mm SL) are apparently immature, the smallest transformed male is 67.2 mm SL.

Distribution.—*Dactyloscopus foraminosus* is presently known from depths of 21–78.6 m along Brazilian coasts from 00°24′N to 25°16′S and, provisionally, from off southeastern Florida (11–48 m).

Material Examined.—16 specimens, 40.9–74.2 mm SL, including holotype and 12 paratypes.

Holotype.—USNM 221437 (71.0 mm SL, transformed male), Brazil, 00°24′00″N, 47°32′00″W, 29.3 m, trawl, OREGON II Sta. 17706, 13 May 1975, B. B. Collette.

Paratypes.—BRAZIL: GCRL 16927 (1, 72.4, cleared and stained) and USNM 221438 (1, 74.2), 01°40′00″N, 47°55′00″W, OREGON II Stas. 17698–99, 12 May 1975, B. B. Collette. USNM 221439 (1, 67.2), 01°21′00″N, 47°32′00″W, 56.7–60.3 m, OREGON II Stas. 17700–01, 12 May 1975, B. B. Collette. ANSP 144090 (1, 68.4) and USNM 221440 (1, 68.3), 00°54′00″N, 46°42′00″W, 69.5–78.6 m, OREGON II Sta. 17717, 15 May 1975, B. B. Collette. GCRL 16926 (1, 62.3) and USNM 221441 (1, 63.5), taken with holotype. MZUSP 14725 (1, 59.7) and USNM 221442 (2, 59.2–62.5), ca. 01°07′00″S, 44°43′00″W, 32.9–36.6 m, OREGON II Stas. 17724–31, 17–18 May 1975, B. B. Collette. GCRL 9326 (1, 40.9), 24°51′00″S, 47°29′44″W, 21 m, 4 June 1971, Iwai. GCRL 9325 (1, 43.9), 25°16′00″S, 47°26′00″W, 38 m, 12 Dec. 1971, Y. Matsuura.

Other Material.—UNITED STATES, East Florida, Indian River Co.: HBF 107-1717 (1, 60.4). St. Lucie Co.: HBF 107-1719 (1, 51.1). Monroe Co.: ANSP 70832 (1, 72.5).

Dactyloscopus comptus new species
Figure 10

Diagnosis.—Posterior naris on anterior rim of preorbital (Fig. 3a); last lateral-line scale the penultimate scale on lower part of caudal-fin base; height of extended eyestalk about equal to orbit diameter; eye with distal circlet of translucent spots, small bump-like protrusions or dermal flaps; dorsal fin usually discontinuous; total dorsal-fin rays usually 37–38; preopercular canal pores 13 or less; modally 16 scales in lateral-line arch; premaxillary pedicel reaches past rear margin of orbit.

Description.—Measurements (mm) of 33.5 mm SL, transformed male, holotype follow: caudal-fin length 4.5, length of uppermost segmented caudal-fin ray 4.3, lengh of lowermost segmented caudal-fin ray 3.8, depth of caudal peduncle 1.7, body depth 5.2, predorsal length 6.8, preanal length 8.9, head length 7.1, head breadth 4.8, maxillary to upper opercular angle 6.6, maxillary to upper preopercular angle 5.1, diameter of bony orbit 1.4, height of eye 1.3, postorbital length 4.8, upper jaw length 2.7.

See Tables 2–16 for meristic data.

Anterior profile broadly rounded in dorsal aspect (Fig. 10). Dorsal fin usually with two free anterior spines, infrequently continuous (Table 3); adults usually with 6–7 branched caudal-fin rays; eyestalk not slender and elongate, height about equals orbit diameter; eye typically with distal circlet of transcluent spots or dermal protrusions which, when best developed, appear as a ring of flaps (Fig. 11).

Scales usually in three rows between lateral-line arch and 1st–2nd dorsal spines, a single row above posterior portion of arch; usually with 1–3 rows of 3–4 scales in advance of line between base of 1st dorsal spine and origin of lateral line (Fig. 5a). Last lateral-line scale, the penultimate scale on lower part of caudal-fin base, with canal angled posteroventrad and with distal pore opening above ventral margin of caudal-fin base (Fig. 4b); without notch in ventral margin of peduncle or caudal-fin base; longitudinal scale rows 4 + 1 + 4. Pseudobranchiae 6 (one specimen examined); premaxillary pedicel reaches about a third of orbit diameter past rear margin of orbit.

Coloration.—Except for blackish eyes, most study specimens are pale and without prominent persistent markings; some fish have 1–2 small isolated melanophores on preanal midline; oral pigmentation absent. A poorly preserved specimen from Puerto Rico (USNM 128832), provisionally identified as *D. comptus*, retains traces of some narrow brownish bars on dorsum between nape and caudal-fin base.

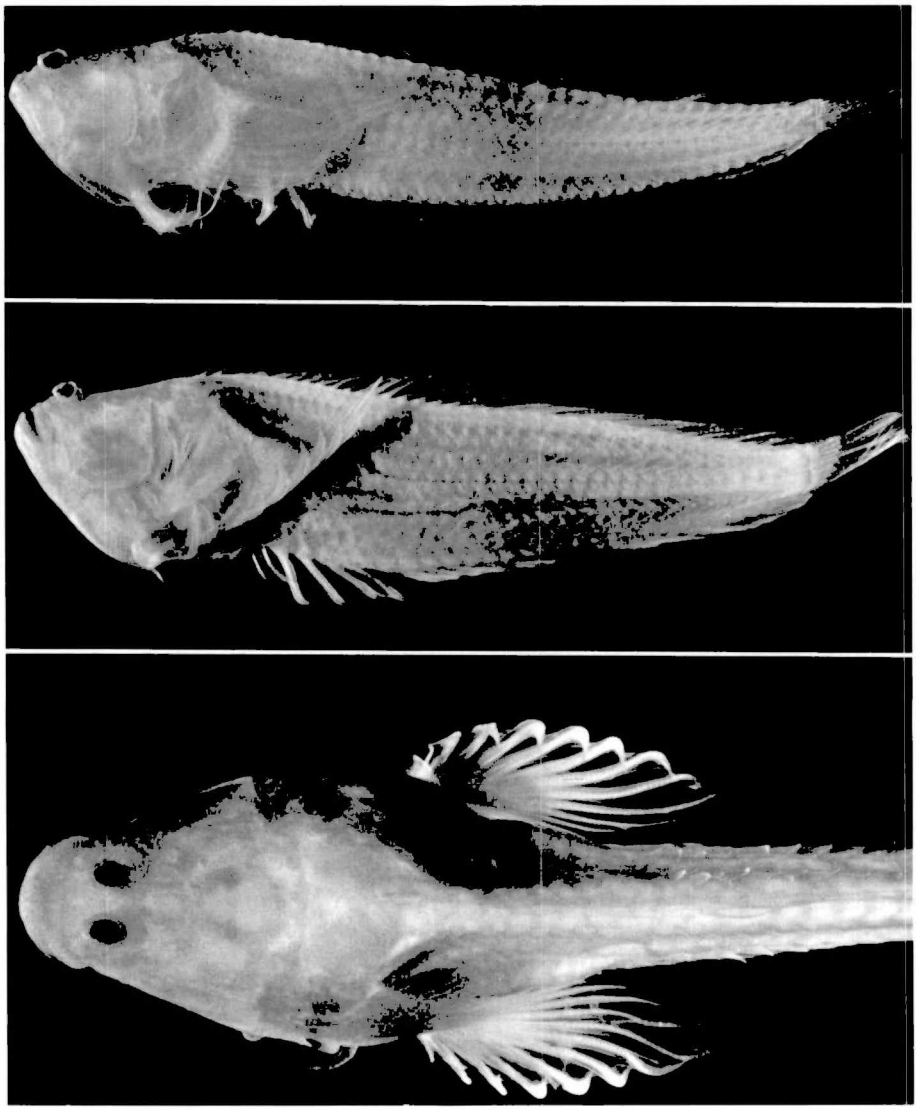


Figure 10. *Dactyloscopus comptus* n. sp. Top: GCRL 16920 (30.9 mm SL, transformed male, paratype). Middle and bottom: ANSP 110197 (39.4 mm SL, female, paratype).

Etymology.—Named *comptus,* adorned or ornamented, in allusion to the circlet of flaps or spots on the eye.

Comparisons.—The ornamented eye of *D. comptus* is unlike that of any congener. Among Atlantic forms, this species has the lowest values for most meristic features (Tables 4–15) and shares position and orientation of the last lateral-line scale (Fig. 4b) with only *D. moorei* and *D. poeyi.* In addition, *D. comptus* differs from these species in its smaller size (max. SL, 39 mm against 67–75 mm).

Remarks.—Small fish (20–25 mm SL) usually have 3–5 translucent distal spots on the eye and these are often difficult to see under ×30 magnification. However,

Figure 11. Delineation of upper lip, preorbital area and eyes of adult *Dactyloscopus comptus*, illustrating optimum development of ornamentation on distal portion of expanded eyestalk. From ANSP 110197.

location and orientation of the last lateral-line scale, together with counts of total dorsal-fin rays, segmented anal-fin rays and total lateral-line scales, permits ready identification of most young fish. Among present material, the smallest transformed male is 24.8 mm SL.

Distribution.—All material is from the Bahamas, except for two provisionally identified specimens from Puerto Rico and St. John, Virgin Is. Most specimens are recorded from shore collections in 0–1.5 m; there are two SCUBA samples from 9.1 and 12.2 m.

Material Examined.—55 specimens, 13.4–39.4 mm SL, including holotype and 49 paratypes.

Holotype.—ANSP 144083 (33.5 mm SL, transformed male), Bahama Is., Ragged Is., Nurse Cay, 0–0.6 m, Sta. TS-9, 12 Jan. 1968, J. C. Tyler and W. N. Eschmeyer.

Paratypes.—Bahama Is., Rose I.: ANSP 144086 (6, 19.7–30.7) and GCRL 16921 (2, 30.6–30.7), N shore, sand beach, 0–1.2 m, Sta. 702, 25 Aug. 1972, J. E. Böhlke and party. Green Cay (Tongue-of-the-Ocean): ANSP 144085 (4, 18.4–26.8), clear sand, 0–1.5 m, Sta. 402, 15 July 1957, C. C. G. Chaplin and party. Andros I.: ANSP 144084 (15, 22.8–29.5), GCRL 16922 (2, 24.6–31.2) and USNM 221436 (2, 24.8–26.8), W side of southern Long Bay Cay, 0–1.2 m, Sta. 396, 12 July 1957, C. C. G. Chaplin and party. N Bimini I.: ANSP 110197 (1, 39.4), W of Crossing Rocks, sand, 12.2 m, 24 June 1957, R. Robertson. Ragged Is.: ANSP 126656 (12, 22.7–33.7), GCRL 16919 (2, 27.7–34.1, cleared and stained) and GCRL 16920 (3, 27.5–30.9), taken with holotype.

Other Material.—Bahama Is.: ANSP 110437 (2, 27.6–29.0), UMML 907 (1, 27.9). Puerto Rico: USNM 128832 (1, 38.8). Virgin Is., St. John: UMML 14317 (1, 13.4).

Table 4. Frequency distributions of total dorsal spines in Atlantic species of sand stargazers (* primary type)

	Total dorsal spines												
Genus and species	8	9	10	11	12	13	14	15	16	17	18	19	20
Dactyloscopus													
crossotus				5	110*	76	1						
tridigitatus			3	202	297	3							
boehlkei		1	37*	18									
foraminosus			10*	4									
comptus			10	34	11*								
moorei		1	5	51	49	12*							
poeyi				8	91*	114	8						
Leurochilus													
acon							3	10*	1	1			
Gillellus													
uranidea						11	84*	20					
healae				4	12*	3							
jacksoni										3	5	3*	
greyae											20	91*	25
Platygillellus													
rubrocinctus								7	171*	43			
smithi								1*					
Myxodagnus													
belone	15	12*											
Dactylagnus													
peratikos		2	8*										
Storrsia													
olsoni							1*						

Dactyloscopus moorei (Fowler)
Figure 12

Congrammus moorei Fowler, 1906:105, fig. 13 (original description; Hailer's Rock (rock, northeast of Bahia Honda), Florida Keys).

Diagnosis.—Posterior naris on anterior rim of preorbital (Fig. 3a); last lateral-line scale the penultimate scale on lower part of caudal-fin base; without notch in ventral margin of caudal peduncle or caudal-fin base; height of extended eyestalk about equal to orbit diameter; with or without distal spot or dermal flap; dorsal fin usually continuous; total dorsal-fin rays usually 39–41; preopercular canal pores 18 or less; modally 16 scales in lateral-line arch; premaxillary pedicel reaches past rear margin of orbit.

Description.—Measurements (mm) of 42.6 mm SL, transformed male, holotype follow: caudal fin damaged, depth of caudal peduncle 2.1, body depth 5.4, predorsal length 7.8, preanal length 10.5, head length 8.4, head breadth 5.8, maxillary to upper opercular angle 7.5, maxillary to upper preopercular angle 5.3, diameter of bony orbit 1.2, postorbital length 5.6, upper jaw length 3.4.

See Tables 2–16 for meristic data.

Anterior profile broadly rounded in dorsal aspect (Fig. 12). Dorsal fin usually continuous, the anterior membranes incised but typically without free anterior spines (Table 3); adults with 6–8 branched caudal-fin rays; dorsal spines 9–13

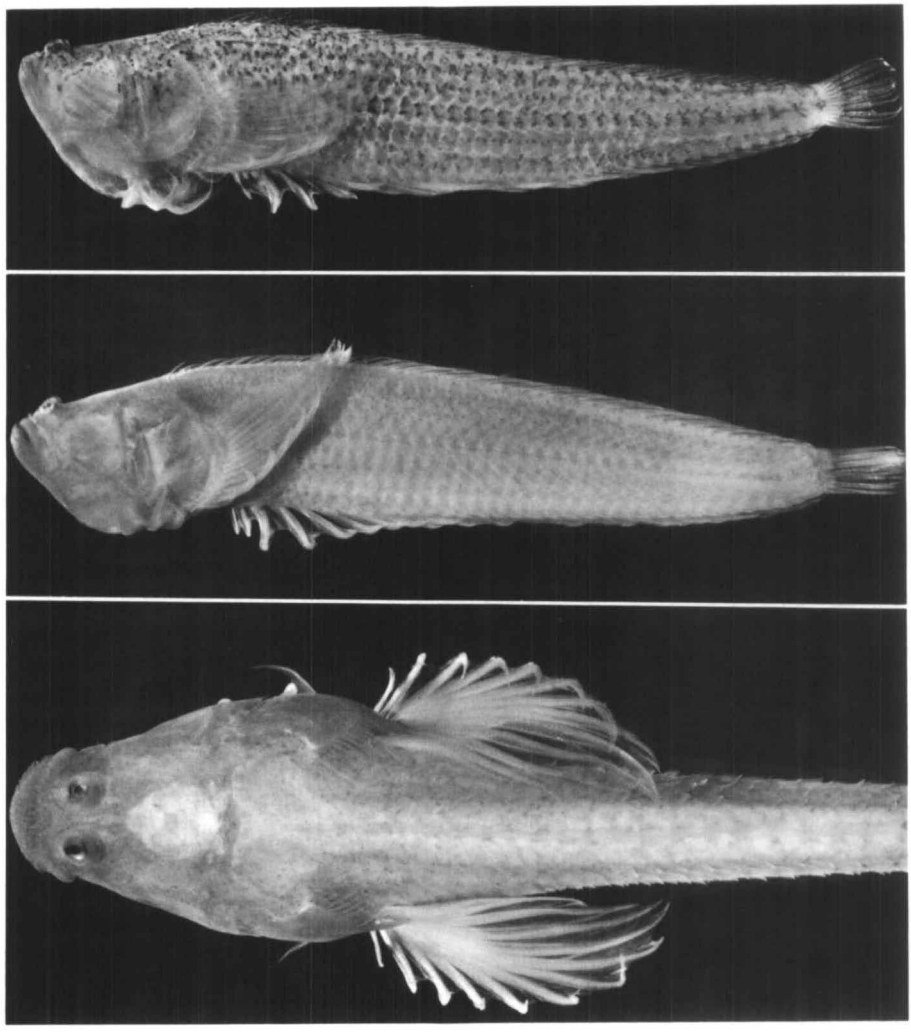


Figure 12. *Dactyloscopus moorei* (Fowler). Top: GMBL 74-183 (59.4 mm SL, male). Middle and bottom: UWF 418 (62 mm SL, male).

(11–12 in 84% of specimens examined); segmented anal-fin rays 30–34 (32 or less in 80%); total lateral-line scales 43–47 (46 or less in 90%); eyestalk not slender and elongate, height about equal to orbit diameter; eye with or without a distal translucent flap or pigmented spot.

Scales usually in 3–4 rows between lateral-line and 1st–2nd dorsal spines, with 1.5–2 rows above posterior portion of arch; usually with 2–4 rows of 3–4 scales in advance of line between origins of dorsal fin and lateral line (Fig. 5a); last lateral-line scale, the penultimate scale on lower part of caudal-fin base, with canal angled posteroventrad and with distal pore opening above ventral margin of caudal-fin base (Fig. 4b); without notch in ventral margin of peduncle or caudal-fin base; longitudinal scale rows 5 + 1 + 4–6. Pseudobranchiae 7–8 (two specimens examined); premaxillary pedicel usually reaches a third or more of orbit diameter past rear margin of orbit.

Coloration.—Dorsum of head and body blotched or irregularly barred with brown; dorsolateral part of head and sides of body flecked with brown, sometimes with indications of stripes along scale rows (Fig. 12).

Comparisons.—Posterior naris location on preorbital rim, relatively short eyestalk, position and orientation of last lateral-line scale, and absence of notch in ventral margin of caudal peduncle or fin-base separates *D. moorei* from all Atlantic congeners except *D.comptus* and *D. poeyi*. Absence of a circlet of spots or dermal protrusions on the eye distinguishes *D. moorei* from *D. comptus*, and *D. moorei* further differs in having generally higher values for most meristic features (Tables 4–15) and in reaching a much larger size (max. SL, 75 mm against 39 mm in *comptus*). *Dactyloscopus moorei* is most similar to *D. poeyi* but differs in usually having scales in advance of a line between origins of dorsal fin and lateral line (usually absent in *poeyi*) and in the usually continuous dorsal fin (fin usually with 2–4 free anterior spines in *poeyi*). Moreover, *D. moorei* has generally lower values for such ontogenetic features as frequencies of upper lip and opercular fimbriae and preopercular canal pores (Table 2), as well as somewhat lower frequencies of total dorsal-fin rays (usually 39–40 against 41–42 in *poeyi*), segmented anal-fin rays (usually 32 or less against 33 or more in *poeyi*) and other meristic characters (Tables 4–15).

Remarks.—Fowler (1906) described this stargazer as the type-species of *Congrammus*, a new genus, which he referred to the Blenniidae. Subsequently, Fowler (1941) synonymized *C. moorei*, as well as *Dactyloscopus crossotus* and *D. poeyi*, with *D. tridigitatus*. I find no later references to *D. moorei*, although most authors have continued to treat *D. crossotus* and *D. poeyi* as valid species. Present studies show *D. moorei* to be distinct from *D. tridigitatus* and all examined specimens of *Dactyloscopus* from the Gulf of Mexico (north of the Florida Keys) are here referred to *D. moorei*. There is little doubt that references to *D. tridigitatus* or *D. crossotus* from the Gulf of Mexico are based on misidentified specimens of *D. moorei*. Similarly, records of *D. tridigitatus* from the Atlantic seaboard (north of southern Florida) are also referable to this species. This form is closely related to *D. poeyi* and, although here treated as a separate species, it may prove to be distinct only at the subspecies level.

Some specimens from off North Carolina have dark brown markings whereas markings are usually tan or barely discernible in material from other areas. The eye may be ornamented with a brownish spot or it may bear a translucent dermal protrusion or flap. The eye may be variously plain or ornamented among specimens within a single sample, apparently without regard to sex or state of maturity.

Among material from southern Florida, the smallest transformed male is 33.8 mm SL and developing gonads were noted in a 30.8 mm SL female; the smallest transformed male examined from the Gulf of Mexico is 46.6 mm SL.

Distribution.—*Dactyloscopus moorei* is known from Onslow Bay, North Carolina (ca. 33°33'N) to the vicinity of Key West on the Atlantic seaboard, and from off Cape Sable, Florida (24°55'N) to Fish Pass, Mustang I., Texas (ca. 27°39'N) in the Gulf of Mexico.

This species is recorded from seine collections in southeastern Florida and from several localities in the Gulf of Mexico. There are offshore trawl collections in 11–34.7 m from off North Carolina to northern Florida (Duval Co.) and there are dredge samples from 3–13.7 m in the eastern Gulf of Mexico (24°55'N-29°15'N) and Mississippi Sound.

Material Examined.—139 specimens, 18.6–75.3 mm SL, including holotype.

Holotype.—ANSP 30621 (42.6 mm SL, male), Florida, Monroe Co., Hailer's Rock, 23 June 1904, H. W. Fowler and party.

Other Material.—UNITED STATES, North Carolina: FSM 24428 (1, 63.7), GCRL 16271 (1, 67.0). South Carolina: GMBL 74-183 (2, 48.6–59.4). Georgia: ANSP 107647 (1, 63.9), GCRL 16892 (1, 59.0), SCMRI uncat. (1, 54.0). East Florida, Duval Co.: UMML 33328 (1, 62.5). St. Lucie Co.: HBF 107-1725 (1, 46.4). Martin Co.: USNM 221545 (1, 41.6). Palm Beach Co.: AMNH 16655 (1, 26.4), ANSP 70837-38 (2, 33.6–52.0), LACM 24390 (1, 38.8). Broward Co.: ANSP 95668 (1, 34.5). Dade Co.: ANSP 75765 (2, 32.9–36.8), FSM 24484 (2, 37.0–39.4), GCRL 16901 (2, 38.3–42.5), GCRL 16902 (1, 44.0), GCRL 16903 (6, 39.6–44.8), UMML 746 (3, 30.8–38.1), UMML 1364 (1, 47.9), UMML 1693 (1, 35.7), UMML 2622 (4, 33.8–36.6), UMML 5622 (2, 32.2, one damaged), UMML 33329 (2, 40.1–45.3), UMML 33330 (2, 41.7–42.2), UMML 33331 (1, 39.2), UMML 33332 (3, 44.9–46.0), UMML 33333 (2, 42.2–44.8), UMML 33334 (3, 40.4–44.1), UMML 33335 (1, 43.4), UMML 33336 (1, 33.4), UMML 33337 (2, 27.2–36.3), UMML 33338 (1, 44.4), USNM 221544 (3, 25.0–25.8). Monroe Co.: ANSP 144311 (2, 29.9–43.7), CAS-SU 466 (2, 44.5–53.0), USNM 35006 (1, 31.2). West Florida, Monroe Co. (off Cape Sable): USNM 73136 (1, 36.6). Collier Co.: ANSP 70835-36 (2, 40.4–47.9). Lee Co.: ANSP 70839 (head only), FSM 19436 (1, 41.2). Hillsboro Co.: FDNR 3182 (1, 51.7). Pinellas Co.: FDNR 3263 (1, 40.6), USNM 197739 (1, 46.7). Levy Co.: FSM 9238 (1, 69.0), USNM 73135 (1, 28.7), USNM 116414 (1, 22.5). Franklin Co.: FDNR 2560 (1, 43.6), FSU 13689 (1, 73.7). Bay Co.: FSU 15698 (2, 24.4–26.7), TAMU 311.9 (1, 56.4), TAMU 337.2 (1, 67.4). Okaloosa Co.: FSU 15699 (5, 40.9–65.2), GCRL 14903 (1, 66.8). Escambia Co.: CAS-IU 6980 (1, 60.9), GBERL 1323 (1, 18.6), UMMZ 111831 (1, 52.3), UWF 418 (1, 62.0). Mississippi: GCRL 97 (1, 47.1), GCRL 488 (6, 45.6–48.4), GCRL 489 (1, 33.5), GCRL 824 (1, 34.6), GCRL 2681 (1, 36.8), GCRL 2955 (1, 56.7), GCRL 3034 (2, 45.0–51.2, cleared and stained), GCRL 3737 (8, 46.8–75.3), GCRL 10638 (16, 37.1–49.8), GCRL 10654 (6, 34.3–44.7), GCRL 11158 (2, 62.0–62.5, cleared and stained), GCRL 11864 (1, 34.0). Texas, Nueces Co.: TAMU 919.5 (1, 44.6). LOC. UNCERTAIN: USNM 39363 (1, 38.1), Florida, Lt. J. F. Moser, no other data.

Dactyloscopus poeyi Gill
Figure 13

Dactyloscopus poeyi Gill, 1861:266 (original description, Cuba).
Dactyloscopus (*Dactyloscopus*) *poeyi*. Jordan and Evermann, 1896:465 (new combination).

Diagnosis.—Posterior naris on anterior rim of preorbital (Fig. 3a); last lateral-line scale the penultimate scale on lower part of caudal-fin base; without notch in ventral margin of caudal peduncle or caudal-fin base; height of extended eyestalk equal to or slightly greater than orbit diameter; eye with or without distal pigmented spot; dorsal fin usually discontinuous; total dorsal-fin rays usually 40–42; preopercular canal pores 25 or less; modally 16 scales in lateral-line arch; premaxillary pedicel reaches past rear margin of orbit.

Description.—Measurements (mm) of 46.3 mm SL, transformed male, neotype follow: caudal-fin length 4.8, length of uppermost segmented caudal-fin ray 4.6, length of lowermost segmented caudal-fin ray 4.4, depth of caudal peduncle 1.9, body depth 6.3, predorsal length 7.9, preanal length 11.1, head length 9.1, head breadth 5.6, maxillary to upper opercular angle 8.1, maxillary to upper preopercular angle 6.2, diameter of bony orbit 1.2, height of eye 1.4, postorbital length 5.8, upper jaw length 3.6.

See Tables 1–16 for meristic data.

Anterior profile broadly rounded in dorsal aspect (Fig. 13). Dorsal fin usually with 2–4 free anterior spines, infrequently continuous (Table 3); adults with 6–8 branched caudal-fin rays (Table 1); dorsal spines 11–14 (12–13 in 93% of specimens examined); segmented anal-fin rays 32–35 (33 or more in 92%); total lateral-line scales 45–48 (46 or more in 96%); eyestalk not clearly slender and elongate, height equals or slightly exceeds orbit diameter.

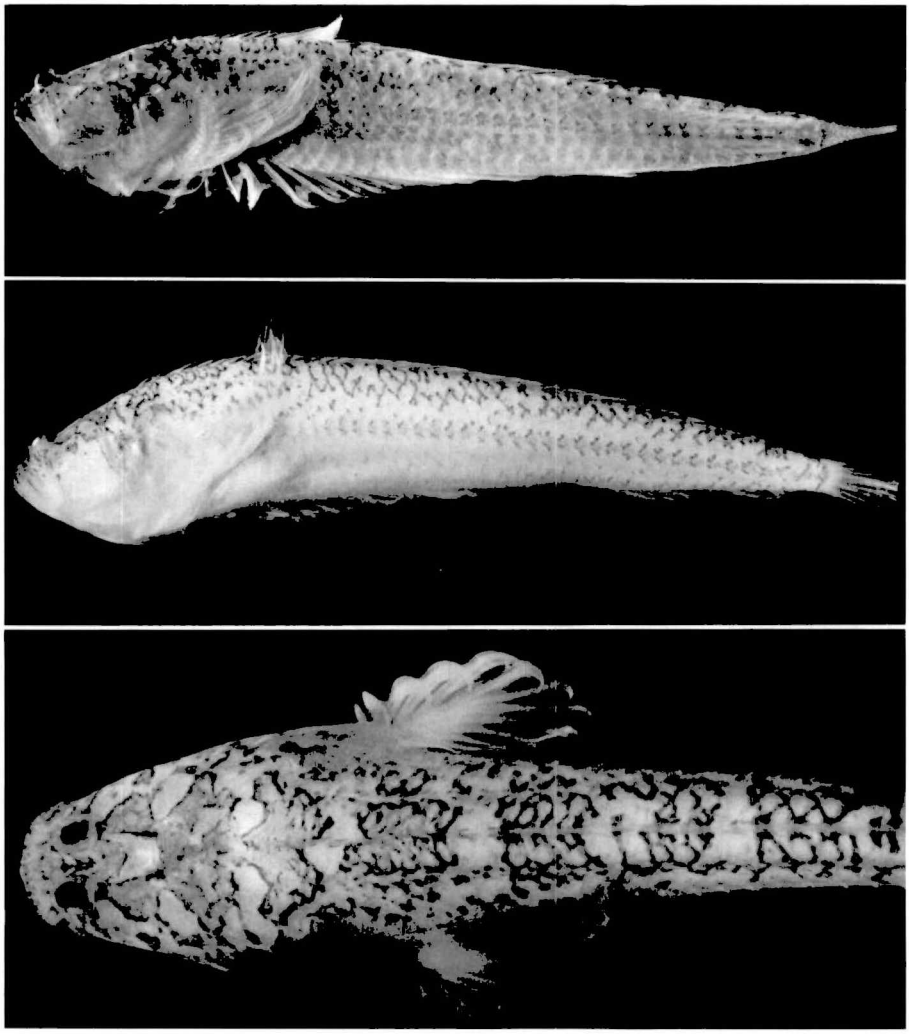


Figure 13. *Dactyloscopus poeyi* Gill. Top: ANSP 120600 (44.7 mm SL, transformed male). Middle and bottom: GCRL 10224 (60.9 mm SL, adult female).

Scales usually in 3–4 rows between lateral line and 1st–2nd dorsal spines, with 1.5–2 rows above posterior portion of arch; usually without rows of scales in advance of line between origins of dorsal fin and lateral line (Fig. 5b); last lateral-line scale, the penultimate scale on lower part of caudal-fin base, with canal angled posteroventrad and with distal pore opening above ventral margin of caudal-fin base (Fig. 4b); longitudinal scale rows 4 + 1 + 4. Pseudobranchiae 6–7 (two specimens examined); premaxillary pedicel usually reaches a third or more of orbit diameter past rear margin of orbit.

Coloration.—Well-marked specimens with dorsum and dorsolateral part of head blotched or irregularly barred with tan or brown (Fig. 13); dorsum of body and upper part of sides with 10–13 brownish bars between nape and caudal-fin base; often with indication of a faint midlateral stripe; oral pigmentation often present.

Comparisons.—Among Atlantic congeners, *D. poeyi* is readily differentiated from *D. crossotus* by differences in form and location of the posterior naris (on preorbital rim in *poeyi*, behind rim in *crossotus*), and from *D. tridigitatus* by the absence of the caudal notch and penultimate location of the last lateral-line scale (notch present, last scale the terminal scale in *tridigitatus*). *Dactyloscopus poeyi* lacks the caudal notch present in *D. boehlkei* and *D. foraminosus* and is further separable from these species by differences in position and orientation of the last lateral-line scale (compare Fig. 4b (*poeyi*) against Fig. 4a). For other comparisons see this section under *D. comptus* and *D. moorei*.

Remarks.—Gill's (1861) description of *D. poeyi* was based on a single specimen from Cuba which was reportedly presented to the Smithsonian Institution. The specimen may have been deposited at the Smithsonian but it has since been lost or destroyed. The description states that the holotype had a total length of 2.6 inches (66 mm), that the body form and eye were similar to those of *D. tridigitatus* and provides the following pertinent counts: dorsal-fin rays 11 + 31, segmented anal-fin rays 32, opercular fimbriae "about 18," lateral-line scales 13 + 3 + 32 (=16 + 32). Coloration was described as ". . . reddish brown, dotted with darker above the lateral line. The head is also blotched and dotted with darker, through which the ground color is exhibited in streaks and blotches, especially around the eyes."

The identity of *D. poeyi* has long been in doubt, due to the lack of the holotype and a clearly diagnostic description, and Fowler (1941) and others have suggested that Gill's specimen was conspecific with *D. tridigitatus*. This cannot be completely discounted, but comparisons of Gill's counts with those given here for *D. tridigitatus* (Tables 4–7, 9, 13–15), shows this to be an unlikely possibility. Gill's count of 48 total lateral-line scales is one more than any of the present 422 counts, 31 segmented dorsal-fin rays are shared with only one of 505 specimens and Gill's count of "about 18" opercular fimbriae is high for *D. tridigitatus* wherein values above 16 occur only in 16 of 1,025 counts. Further comparisons show that the holotype of *D. poeyi* differs from most other species treated here in morphological features, meristic values or geographical distribution. Neither *D. foraminosus* nor *D. moorei* agree with the description in having a body form similar to that of *D. tridigitatus* and neither is known to occur in the Bahamas or the Antilles. *Dactyloscopus comptus* also differs in body form, it evidently fails to reach the size of Gill's specimen (max. 45 mm TL) and maximum values for all counts, except numbers of opercular fimbriae and arched lateral-line scales, are lower than those given by Gill. The eye of *D. boehlkei* is not similar to that of *D. tridigitatus* (short against elongate eyestalk), maximum counts of total dorsal-fin rays and lateral-line scales are one less than those of Gill, and this species is presently known only from the Bahamas. Present data on *D. crossotus* agree with Gill's counts, except for number of opercular fimbriae (max. 16 against "about 18"), but this species differs from *D. tridigitatus* in form of body and eye (similar to *tridigitatus* in holotype of *poeyi*) and seldom attains a total length of 66 mm. The species here referred to *D. poeyi* best agrees with Gill's description in respect to body form, coloration, size (to 67 mm SL) and it occurs in the Bahamas and the Antilles. Furthermore, counts of the holotype fall within those of present material, except in the case of segmented dorsal-fin rays. Here, Gill's count of 31, rather than the present maximum of 30, could have resulted from inaccurate determination of the number of dorsal spines.

In the absence of the holotype and on the basis of the foregoing observations, I here select a specimen of the species described above as the neotype of *Dac-*

Table 5. Frequency distributions of segmented dorsal-fin rays in Atlantic species of sand stargazers (* primary type)

	Segmented dorsal-fin rays																				
Genus and species	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Dactyloscopus																					
crossotus																3	43*	96	46	4	
tridigitatus															2	70	232	180	20	1	
boehlkei																	1	19	23	13*	
foraminosus																		1	1	9*	3
comptus														1	17*	31	6				
moorei															3	26	38*	42	9		
poeyi															1	11	88	99*	22		
Leurochilus																					
acon	1*	6	8																		
Gillellus																					
uranidea			8	59*	46	2															
healae																5	6	8*			
jacksoni							1	4*	6												
greyae									30	58*	44	3	1								
Platygillellus																					
rubrocinctus			13	97	101*	10															
smithi			1*																		
Myxodagnus																					
belone																		6*	20	1	
Dactylagnus																					
peratikos																	4	4	2*		
Storrsia																					
olsoni															1*						

Table 6. Frequency distributions of total dorsal-fin elements in Atlantic species of sand stargazers (* primary type)

Genus and species	Total dorsal-fin elements																	
	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Dactyloscopus																		
crossotus													1	22*	85	73	9	2
tridigitatus												10	125	264	101	5		
boehlkei													7	33	16*			
foraminosus														1	8*	5		
comptus										1	14	35*	5					
moorei												5	32	60	21*			
poeyi														31	132*	55	3	
Leurochilus																		
acon	2*	5	7	1														
Gillellus																		
uranidea		6	56*	41	11	1												
healae													3	11	5*			
jacksoni										1	4	6*						
greyae													24	68*	38*	3	3	
Platygillellus																		
rubrocinctus				9	84	105*	23											
smithi			1*															
Myxodagnus																		
belone												20*	7					
Dactylagnus																		
peratikos												5	4	1*				
Storrsia																		
olsoni														1*				

Table 7. Frequency distributions of segmented anal-fin rays in Atlantic species of sand stargazers (* primary type)

Genus and species	Segmented anal-fin rays															
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Dactyloscopus																
crossotus											1	28	99*	68	9	1
tridigitatus										12	141	289	72	2		
boehlkei												33	24*			
foraminosus													9*	6		
comptus								1	21	33*						
moorei										2	41	59	22*	3		
poeyi												20	151	85*	1	
Leurochilus																
acon		2	4*	10												
Gillellus																
uranidea	3	46*	59	5												
healae											1	15	5*			
jacksoni								3	4*	4						
greyae											19	60*	49	4	2	
Platygillellus																
rubrocinctus			2	66	131*	21	2									
smithi		1*														
Myxodagnus																
belone														1*	18	8
Dactylagnus																
peratikos													1	5	4*	
Storrsia																
olsoni						1*										

tyloscopus poeyi Gill. Cuban material is not available, but this somewhat faded adult male (ANSP 144227) was taken at Cay Sal, within 90 km of the north coast of Cuba. For additional data, see measurements above, Tables 4–15 and materials examined.

Among present material, the smallest transformed male is 34.5 mm SL, the smallest ovigerous female is 31.6 mm SL.

Distribution.—*Dactyloscopus poeyi* is known from the Bahamas, Antilles, and in the western Caribbean Sea from Belize to the State of Saucre, Venezuela. Among 25 collections with acceptable data, 17 are from 0–1.8 m, 7 from 2.1–3.7 m and there is a SCUBA sample from 7.6–9.1 m.

Material Examined.—581 specimens, 12.0–67.4 mm SL, including neotype.
Neotype.—ANSP 144227 (46.3 mm SL, transformed male), Bahama Is., Cay Sal Bank, Cay Sal, near NW point, 0–3 m, Sta. 524, 2 May 1960, J. E. Böhlke and party.

Other Material.—BAHAMA Is.: AMNH 39143 (3, 35.0–41.8), ANSP 110191 (1, 47.8), ANSP 110436 (211, 20.9–37.5), ANSP 110438 (81, 21.7–50.2), ANSP 144237 (7, 26.3–56.8), ANSP 144238 (1, 12.0), ANSP 144239 (1, 36.8), ANSP 144240 (1, 38.6), ANSP 144241 (4, 43.1–50.8), ANSP 144242 (1, 19.8), ANSP 144243 (5, 24.5–38.7), ANSP 144244 (147, 24.6–45.6), ANSP 144245 (1, 39.0), ANSP 144246 (13, 14.0–42.1), GCRL 16896 (4, 40.6–43.6, cleared and stained), GCRL 16928 (10, 34.8–44.7), UMML 6386 (4, 14.4–15.4). GREATER ANTILLES, Jamaica: LACM 39300-2 (1, 33.6). LESSER ANTILLES, Virgin Is.: ANSP 144247 (1, 32.0). St. Martin: UMML 33339 (5, 20.8–41.9), UMML 33340 (21, 20.7–46.8). Saba I.: ZMA 114.165 (1, 45.4). Dominica: USNM 221484 (15, 23.8–45.9). St. Lucia: CAS-SU 4165 (1, 37.1), USNM 41738 (1, 37.4). BELIZE: ANSP 107645 (1, 46.0), ANSP 107646 (1, 43.2), UMML 9601 (8, 32.8–40.8). HONDURAS: ANSP 144248 (5, 40.7–54.9), GCRL 7832 (2, 31.3–37.0). PANAMÁ, Canal Zone: GCRL 7833 (1, 30.0), GCRL 10224 (23, 49.3–67.4), GCRL 11156 (2, 63.0, cleared and stained). VENEZUELA, Saucre: ANSP 120468 (1, 56.8).

Genus *Leurochilus* Böhlke

Leurochilus Böhlke, 1968:2 (type-species: *Leurochilus acon* Böhlke 1968, by original designation).

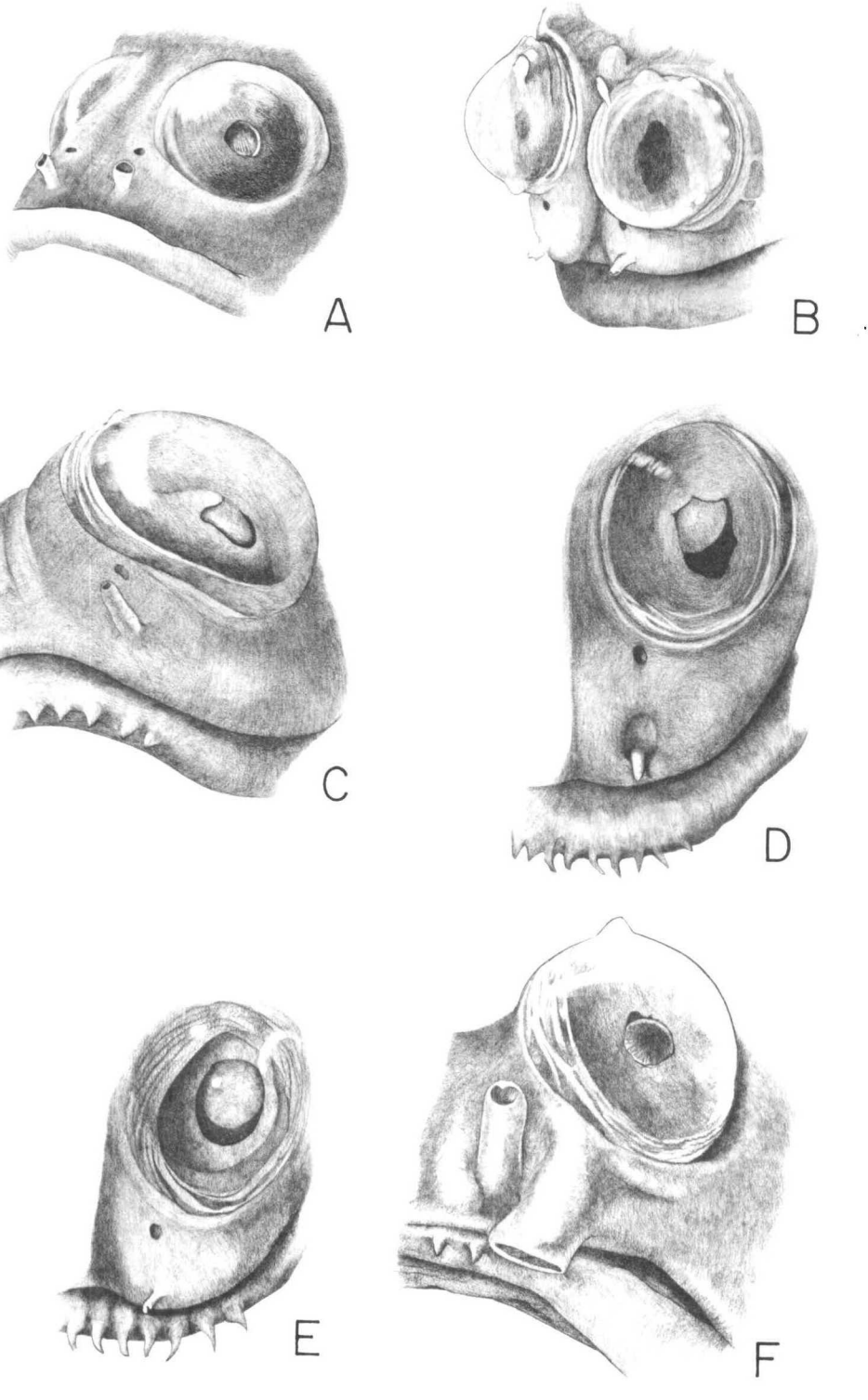
Diagnosis.—Dorsal fin with a distinct 3-spined anterior finlet originating on nape; lower jaw narrowly rounded in dorsal aspect, somewhat protruding but without a prominent, conical, anterior fleshy projection; labial fimbriae absent; opercle typically with 1–5 rudimentary fimbriae in adults; anterior naris tubiform, located just behind anterior rim of preorbital; posterior naris a simple pore, located just before anteromesial margin of orbit (Fig. 14a); eye barely protrusile, without distal spot or other ornamentation; venter, head and pectoral-fin base without scales; scales less numerous in lateral-line arch than in straight lateral line; last lateral-line scale the penultimate scale near middle of caudal-fin base (Fig. 15a); canals unbranched in scales of straight lateral line; tip of adpressed pectoral fin reaches beyond descending portion of lateral-line arch; principal preopercular canals 3, the first unbranched and with a single distal pore; pectoral-fin rays modally 13; segmented caudal-fin rays modally 11; premaxillary pedicel not reaching past rear margin of orbit; without predorsal interneurals; caudal vertebrae 25–26.

Description.—The genus is monotypic, see description of *L. acon*.

Comparisons.—*Leurochilus* shares the isolated or semi-isolated dorsal finlet originating on nape with *Gillellus, Platygillellus* and *Heteristius* Myers and Wade,

→

Figure 14. Location of nares together with typical ornamentation of eye and upper lip in selected Atlantic dactyloscopids. A, *Leurochilus acon;* B, *Gillellus uranidea;* C, *Platygillellus rubrocinctus;* D, *Myxodagnus belone;* E, *Dactylagnus peratikos;* F, *Storrsia olsoni.*


A
B
C
D
E
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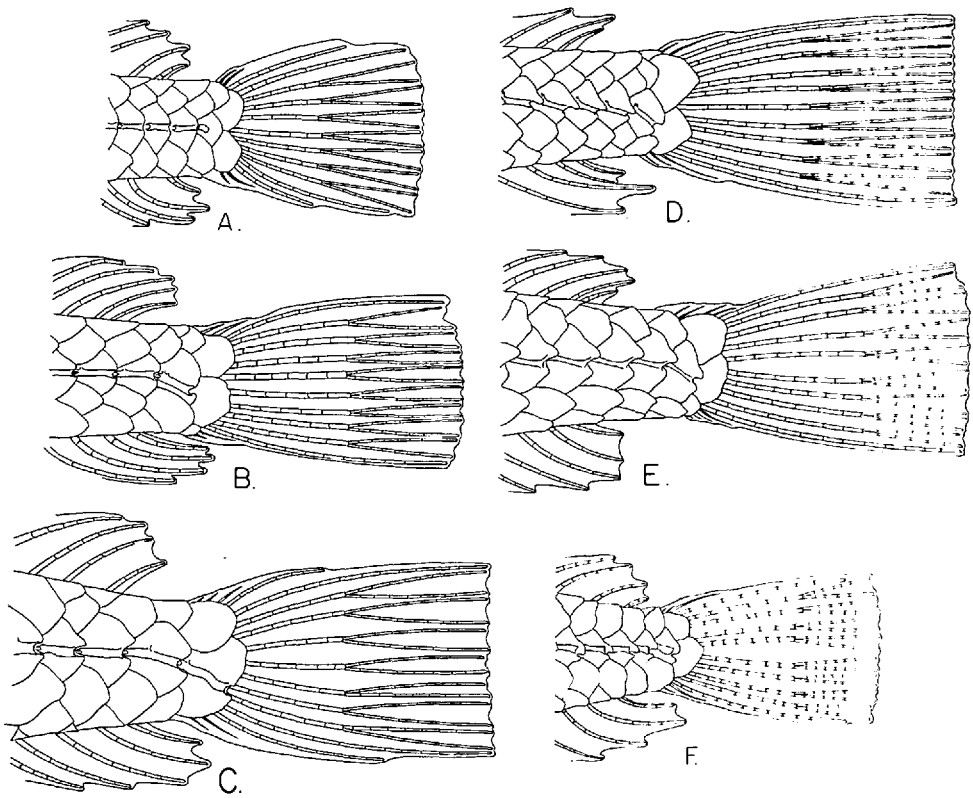

Figure 15. Posterior body and fins, illustrating typical squamation and adult development of segmented caudal-fin rays, in selected Atlantic dactyloscopids. A, *Leurochilus acon*; B, *Gillellus greyae*; C, *Platygillellus rubocinctus*; D, *Myxodagnus belone*; E, *Dactylagnus peratikos*; F, *Storrsia olsoni*.

but differs from these genera in the absence of lower lip fimbriae. *Leurochilus* further differs from *Gillellus* in modal counts of segmented caudal-fin rays (11 against 10 in *Gillellus*), in the absence of eye ornamentation (typically present in *Gillellus*) and in having fewer scales in the lateral-line arch than in the straight lateral line (arch scales most numerous in *Gillellus*). *Leurochilus* shares the modal count of 11 segmented anal-fin rays with *Platygillellus* but lacks labial fimbriae and the scaled venter present in adults of *Platygillellus* and *Heteristius*.

Remarks.—Known only from Atlantic waters.

Leurochilus acon Böhlke
Figure 16

Leurochilus acon Böhlke, 1968:4, fig. 1 (original description; Andros I., Bahamas).

Diagnosis.—See that of genus.

Description.—Measurements (mm) of 23.8 mm SL, transformed male, holotype follow: caudal-fin length 4.9, length of uppermost segmented caudal-fin ray 4.3, depth of caudal peduncle 1.6, body depth 3.4, predorsal length 5.2, preanal length 7.9, head length 5.7, head breadth 3.1, maxillary to upper opercular angle 5.4,

Figure 16. Top: *Leurochilus acon* Böhlke. ANSP 111595 (21.3 mm SL, transformed male, paratype). Bottom pair: *Gillellus uranidea* Böhlke. HBF 107-3203 (27.8 mm SL, female).

maxillary to upper preopercular angle 3.4, diameter of bony orbit 0.9, postorbital length 3.6, upper jaw length 1.7.

See Tables 4–9, 13–16 for meristic data.

Anterior dorsal finlet isolated from remainder of dorsal fin by a short space, its height less than predorsal length; caudal-fin formula of adults usually 2 + 7 + 2; often with supplementary pores above distal pore of 1st primary preopercular canal; opercular fimbriae usually 3, infrequently absent, reduced to irregular small points or emarginations; eye more or less dorsolateral, height about half of orbit diameter.

Lateral line deflects between verticals from 8th–10th dorsal spines; tip of adpressed pectoral fin reaches vertical between 12th–16th dorsal-fin supports; typ-

ically with a single complete or incomplete scale row above lateral-line arch; canal of last lateral-line scale not angled ventrad (Fig. 15a); longitudinal scale rows 3 + 1 + 3. Pseudobranchiae 7 (one specimen examined); without paired pores in infraorbital canal; premaxillary pedicel reaches posterior third of orbit, usually falls short of posterior margin.

Coloration.—Present material pale throughout, except for blackish eye. Böhlke (1968) described the holotype as having several indistinct brownish bars on the body and noted that most of the type material had faint transverse brownish markings on the dorsum.

Comparisons.—This species could, at first glance, be confused with early juveniles of *Dactyloscopus crossotus* or *Gillellus uranidea*. *Leurochilus acon* is readily distinguished from both by the presence of 11 rather than 10 segmented caudal-fin rays. It is further separable from *Dactyloscopus crossotus* by the presence of an anterior dorsal finlet (absent in *crossotus*) and from *Gillellus uranidea* by the greater number of straight lateral-line scales (19–22 against 12–15). For additional comparisons, see under *Leurochilus*.

Remarks.—This is one of the smallest dactyloscopids and males may be transformed at 19.8 mm SL. Böhlke (1968) noted that a 17.5 mm female contained 21 ovarian eggs, ca. 1.0 mm in diameter.

In the Bahamas, *L. acon* has been taken in the same collection with *Dactyloscopus crossotus, Gillellus greyae* and *Myxodagnus belone* (Böhlke, 1968).

Distribution.—*Leurochilus acon* is known from the Bahamas, Virgin Is. (Anegada I.) and Antigua in the Lesser Antilles. Available records indicate that 6 of 8 known collections were in depths of 0–7.6 m.

Material Examined.—18 specimens, 11.8–23.8 mm SL, including holotype and 13 paratypes (for complete data on paratypes, see Böhlke, 1968).

Holotype.—ANSP 111592 (23.8 mm SL, male), Bahama Is., Middle Bight, E side of Andros I., ca. 7.4 km N of Mastic Cay, 3.7 m, Sta. 565, 8 Nov. 1961, J. E. Böhlke and party.

Paratypes.—BAHAMA IS.: ANSP 111593 (1, 18.0), ANSP 111594 (1, 20.2, cleared and stained), ANSP 111595 (4, 11.8–21.5), ANSP 111596 (2, 15.0–20.6), GCRL 13340, formerly ANSP 111595 (2, 17.2–17.4), UMML 1728 (1, 20.6), UMML 6354 (1, 20.7), USNM 202734 (1, 18.3).

Other Material.—BAHAMA IS.: ANSP 116457 (2, 15.8–17.4). LESSER ANTILLES, Virgin Is.: BMNH 1976.7.15.201 (1, 19.8). Antigua: FSM 30013 (1, 19.8).

Genus *Gillellus* Gilbert

Gillellus Gilbert, 1890:98 (type-species: *Gillellus semicinctus* Gilbert 1890, by original designation).

Diagnosis.—Dorsal fin with a distinct 2–3 spined anterior finlet originating on nape; lower jaw usually rounded in dorsal aspect, without a conical fleshy anterior projection (except in *arenicola*); fimbriae present on opercle and lower lip, absent from upper lip; anterior naris tubiform, located just behind anterior rim of preorbital; posterior naris a simple pore located on preorbital, between anterior naris and orbit (Fig. 14b); eye slightly protrusile but not stalked, usually with one or more dermal flaps or papillae; venter, head and pectoral-fin base without scales; scales (except in occasional specimens of *G. ornatus* and *G. arenicola*) more numerous in lateral-line arch than in straight lateral line; last lateral-line scale the penultimate scale on caudal-fin base; canals unbranched in scales of straight lateral line, usually with a pore on dorsal margin; tip of adpressed pectoral fin may reach to or slightly beyond descending portion of lateral-line arch, usually falls

Table 8. Frequency distributions of caudal vertebrae and pectoral-fin rays in Atlantic species of sand stargazers (* primary type)

	Caudal vertebrae														Pectoral-fin rays			
Genus and species	23	24	25	26	27	28	29	30	31	32	33	34	35	36	12	13	14	15
Dactyloscopus																		
crossotus										9	92*	76	8	1	13	372*	9	
tridigitatus									13	120	179	41	2		16	587	11	
boehlkei										2	28	28*			1	111*		
foraminosus											1	2	13*			20*	2	
comptus							1	8	41*	3					1	105*	4	
moorei									3	45	53*	26			10	196*	6	
poeyi											14	148	88*	3	8	391*	7	
Leurochilus																		
acon			7	8*												28*	4*	
Gillellus																		
uranidea	1	26	51*	18											7	192*	15	
healae										1	14*	5				36*	3	
jacksoni							2	2*	4						1	20*	1*	
greyae									2	29	52*	39	1	2	7	228*	10	
Platygillellus																		
rubrocinctus			15	127*	43	2										15	330*	10
smithi	1*																2*	
Myxodagnus																		
belone													14*	12	2	49*	3	
Dactylagnus																		
peratikos													4*	6		20*		
Storrsia																		
olsoni						1*										2*		

Table 9. Frequency distributions of opercular fimbriae in Atlantic species of sand stargazers (* primary type)

	Opercular fimbriae																							
Genus and species	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Dactyloscopus																									
crossotus								2	11	17	62*	84	97*	76	48	16	2								
tridigitatus									7	9	33	96	229	283	231	86	35	12	3	1					
boehlkei														1	3	13	14	22	21	22*	8	3	1*		
foraminosus																		3	4	7	6*	5	3*		
comptus												1	1	1	15	30	35	16*	7*	2		2			
moorei										1	1			3	10	33	62*	48	42	28	16	10	2		
poeyi										1	1	2	3	7	11	31	35	53	72*	96	101	56	36	9	1
Leurochilus																									
acon	1	2	4	11*	4	3																			
Gillellus																									
uranidea				1	2	27*	53*	83	26	13															
healae						1	8*	11	8	9	1														
jacksoni						2	5	6	6*	3*															
greyae						9	13	33	29	22*	10		1												
Platygillellus																									
rubrocinctus						1	12	83	134	136*	35*	8													
smithi											1*	1*													
Myxodagnus																									
belone								9	23*	14	2			1											
Dactylagnus																									
peratikos												8*	6	2	1										
Storrsia																									
olsoni												2*													

short of descending arch; principal preopercular canals 3, the 1st unbranched and with a single distal pore; pectoral-fin rays modally 12 or 13; segmented caudal-fin rays modally 10, usually with 7–8 branched rays in adults; premaxillary pedicel not continued well past rear margin of orbit; without predorsal interneurals; caudal vertebrae 23–28.

Description.—See Dawson, 1977.

Comparisons.—*Gillellus* shares the isolated or semi-isolated dorsal finlet originating on nape with *Leurochilus, Platygillellus* and *Heteristius* but differs from these genera in having fewer segmented caudal-fin rays (modally, 10 against 11 or 12). Furthermore, *Gillellus* has fimbriae on the lower lip (absent in *Leurochilus*) and there are more scales in the lateral-line arch than in the straight portion of the lateral line (scales most numerous in straight portion in *Leurochilus*). *Gillellus* further differs from *Platygillellus* and *Heteristius* in having fewer pectoral-fin rays (modally, 12 or 13 against 14) and lacks upper lip fimbriae and venter scales (present in *Platygillellus* and *Heteristius*).

Remarks.—Species of *Gillellus* are often marked with alternating dark saddle-like bars and pale interspaces. The bars usually cross the dorsum and terminate near lateral midline. Individual collections usually include 1–5 specimens and most appear to have been taken on or near rock or coral habitats. Maximum recorded depth of capture is 137 m; maximum known size is 77.7 mm SL. The genus is represented by 5 species in the eastern Pacific (Dawson, 1977) and 4 Atlantic species are reported here.

Gillellus uranidea Böhlke
Figure 16

Gillellus uranidea Böhlke, 1968:9, fig. 4 (original description; Flamingo Cay, Jumentos Cays, Bahamas).

Diagnosis.—Dorsal spines 13–15; segmented dorsal-fin rays 14–17; segmented anal-fin rays 21–24; total lateral-line scales 36–41; lower lip fimbriae usually 4; with or without 4–5 broad dark bars crossing dorsum from nape to caudal-fin base.

Description.—Measurements (mm) of 20.6 mm SL, female, holotype follow: caudal-fin length 4.6, length of uppermost segmented caudal-fin ray 4.0, length of lowermost segmented caudal-fin ray 3.1, depth of caudal peduncle 1.2, body depth 3.6, predorsal length 4.5, preanal length 7.1, head length 5.9, head breadth 4.2, maxillary to upper opercular angle 5.3, maxillary to upper preopercular angle 3.8, diameter of bony orbit 1.1, height of eye 0.7, postorbital length 2.8, upper jaw length 2.3.

See Tables 4–9, 11, 13–16 for meristic data.

Dorsal finlet 3-spined; total dorsal-fin rays 28–32; lower lip with 2–4 (usually 4) lobe-like conical fimbriae near symphysis; eye usually ringed with a circlet of dermal flaps or protrusions below distal extremity (Fig. 14b), often with a mesiodistal flap.

Without scales between dorsal-fin base and lateral-line arch; 22–27 scales in lateral-line arch, 11–15 in straight lateral line; one enlarged terminal scale on caudal-fin base; longitudinal scale rows 3 + 1 + 3. Pseudobranchiae 4–6 (Böhlke, 1968); infraorbital canal with some paired pores; premaxillary pedicel reaches to or just past rear margin of orbit.

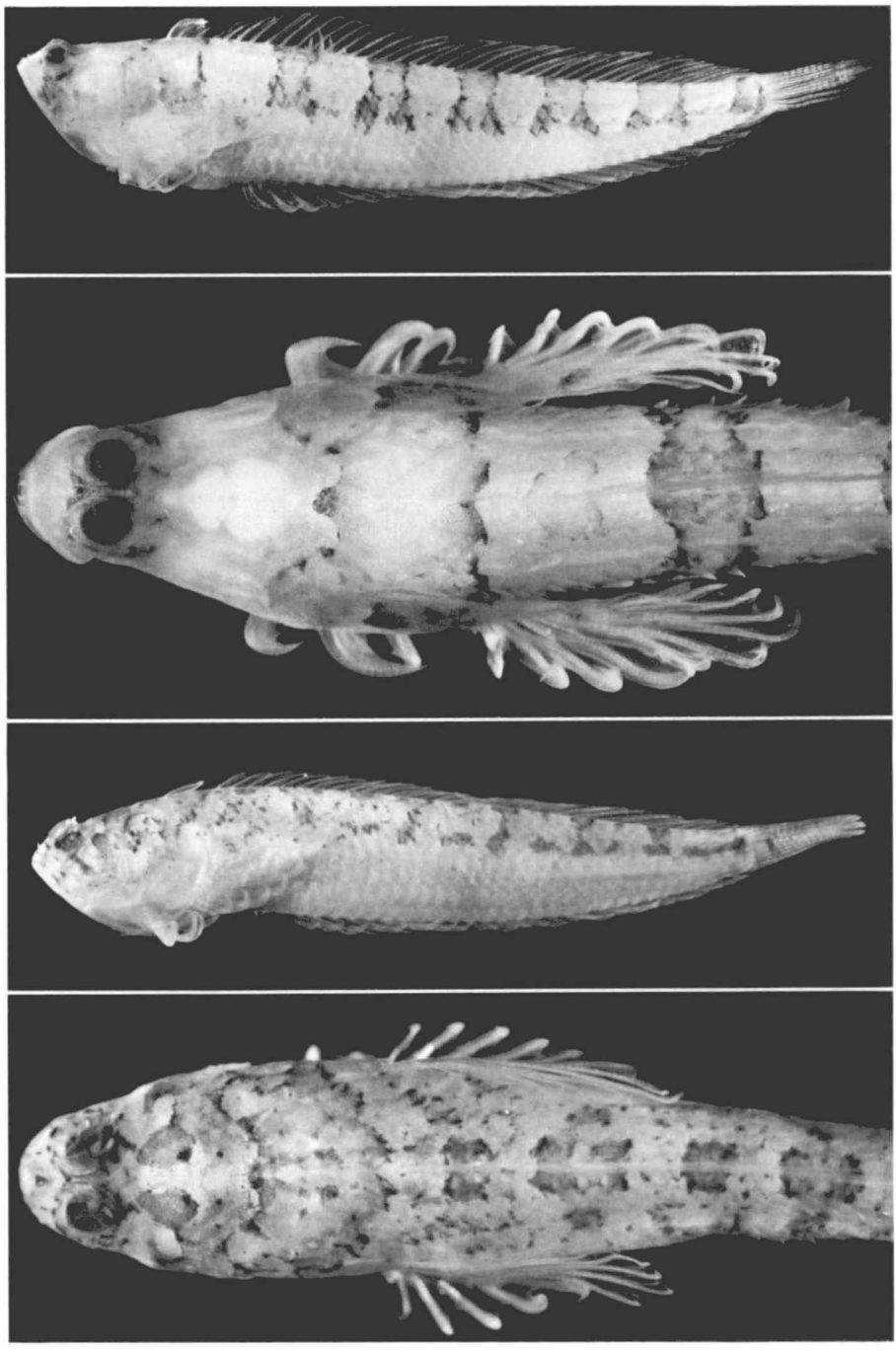

Figure 17. Upper pair: *Gillellus healae* n. sp. GCRL 16915 (37.1 mm SL, presumably female, paratype). Lower pair: *Gillellus jacksoni* n. sp. ANSP 144081 (24.9 mm SL, female or young male, holotype).

Coloration.—Variably plain, with traces of brownish on side and dorsum, or with 4–5 broad dark bars crossing dorsum and side from nape to caudal-fin base (Fig. 16); anterior portions of head often with dark spots or blotches.

Comparisons.—*Gillellus uranidea* differs from all congeners in having fewer dorsal-fin elements (28–32 against 36 or more), segmented anal-fin rays (21–24 against 28 or more) and total lateral-line scales (36–41 against 43 or more). Other species also lack the 4–5 broad saddle-like bars which are present in well-marked specimens of *G. uranidea*. Among Atlantic congeners, *G. uranidea* shares the count of 2–4 lower lip fimbriae with *G. healae* and *G. jacksoni*, absence of scales above the lateral-line arch with *G. healae* and single scale on caudal-fin base with *G. jacksoni*.

This species could be confused with small specimens of *Platygillellus rubrocinctus* which usually have similar saddle-like markings. However, *Gillellus uranidea* lacks upper lip fimbriae and scaled venter (present in *Platygillellus*) and has modally 10 rather than 11 segmented caudal-fin rays.

Remarks.—Böhlke (1968) noted stomach contents of this species as including crustacean fragments, and hermit crabs contained in the shells of *Tegula fasciata* and *Cerithium litteratum*. He further counted more than 41 ovarian eggs (in three size groups) in a 27.6 mm SL female. Among present material, the smallest transformed male is 19.7 mm SL.

Distribution.—Based on material examined, *Gillellus uranidea* is known from southeastern Florida (St. Lucie Co. to Monroe Co.), Bahamas, Antilles, and western Caribbean (Belize to San Blas Is., Panamá).

Material Examined.—135 specimens, 7.2–37.4 mm SL, including holotype and 26 paratypes (for complete data on paratypes, see Böhlke, 1968).

Holotype.—ANSP 111598 (20.6 mm SL, female or juvenile male), Bahama Is., Jumentos group, W side of Flamingo Cay, 1.5 m, Sta. WAS-BWI-5, 7 July 1959, E. N. Belcher III and W. A. Starck II.

Paratypes.—UNITED STATES, East Florida: UMML 9246 (1, 20.8), UMML 17968 (2, 21.8–22.1), UMML 18000 (4, 20.7–26.4). BAHAMA IS.: ANSP 111599 (1, 17.7), ANSP 111600 (1, 22.7), ANSP 111601 (1, 19.0), ANSP 111602 (1, 21.4), ANSP 111603 (1, 19.9, cleared and stained), ANSP 111604 (2, 20.4–25.8), FSM 15654 (2, 18.2–22.1), UMML 6281 (1, 20.3), UMML 6335 (2, 9.9–19.7), UMML 7186 (3, 16.7–20.1). MÉXICO, Quintana Roo: UMML 9627 (1, 15.1). BELIZE: UMML 10308 (1, 24.4). NICARAGUA: UMML 23942 (2, 19.6–20.8).

Other Material.—UNITED STATES, East Florida, St. Lucie Co.: HBF 107-3202 (2, 27.2–27.8). Monroe Co.: FSM 16178 (11, 15.4–29.3), FSM 30015 (3, 17.3–29.0), GCRL 16912 (2, 24.7–29.1), UMML 19925 (5, 21.2–24.5), UMML 20057 (3, 25.8–28.0), UMMZ 205434 (1, 21.5). BAHAMA IS.: AMNH 23956 (2, 16.4–19.3), AMNH 25877 (1, 19.7), AMNH 29045 (2, 29.1–30.4), AMNH 31203 (4, 10.6–29.6), AMNH 34041 (2, 24.2–24.8), AMNH 34992 (3, 20.6–22.6), AMNH 39141 (1, 19.6), ANSP 115066 (1, 21.9), ANSP 126667 (1, 32.6), ANSP 144184 (2, 11.2–20.7), FAU 67-15 (1, 26.1), FAU 68-4 (1, 37.4). GREATER ANTILLES, Cayman Is.: ANSP 102247 (1, 21.2), ANSP 102248 (1, 16.2), ANSP 102253 (1, 22.9), ANSP 102266 (2, 17.2–22.8), ANSP 102974 (2, 7.2–20.2), FSM 12377 (4, 14.0–25.1), FSM 12437 (2, 11.6–19.2). Jamaica: UMML 28341 (1, 26.6). Puerto Rico: FSM 24486 (1, 22.3), UMML 33341 (1, 20.5). LESSER ANTILLES, Haiti: ANSP 119063 (5, 15.1–26.0), GCRL 13364 (2, 20.6–21.9). Antigua: FSM 30014 (4, 9.5–17.8). Isla Aves: UMML 32005 (2, 18.8–20.2). BELIZE: FMNH 80470 (1, 16.9), FMNH 80473 (1, 14.4), FMNH 83924 (3, 14.4–25.5), FMNH 83926 (1, 21.6), FMNH 83927 (1, 18.1), FMNH 83928 (1, 22.6), UMML 9556 (1, 24.2), UMML 9843 (1, 18.6), UMML 33342 (3, 20.2–22.9), USNM 221476 (2, 12.0–18.0). HONDURAS, Roatan Is.: FMNH 83923 (2, 17.8–20.4), FMNH 83925 (1, 17.3), GCRL 16913 (2, 24.9–25.3). PROVIDENCIA IS.: FSM 18848 (3, 14.5–22.3), FSM 18889 (1, 20.9), FSM 20845 (3, 19.7–22.8), FSM 24466 (1, 16.6). PANAMÁ, Bocas del Toro: MCZ 52017 (1, 22.5). San Blas: ANSP 119237 (1, 20.8). LOC. UNCERTAIN: FSM 24474 (1, 17.9), possibly Providencia Is.

Gillellus healae new species
Figure 17

Gillellus semicinctus (not of Gilbert, 1890). Gilbert, 1890:98 (in part, specimens from GRAMPUS Sta. 5108 and 5112 only).

Diagnosis.—Dorsal spines 11–13; segmented dorsal-fin rays 27–29; segmented anal-fin rays 31–33; total lateral-line scales 47–48; lower lip fimbriae usually 4; with or without 6 or more dark bars crossing dorsum from nape to caudal-fin base.

Description.—Measurements (mm) of 46.7 mm SL, transformed male, holotype follow: caudal fin damaged, depth of caudal peduncle 2.2, body depth 7.2, predorsal length 8.9, preanal length 14.0, head length 10.4, head breadth 5.7, maxillary to upper opercular angle 9.0, maxillary to upper preopercular angle 6.1, diameter of bony orbit 1.7, height of eye 0.7, postorbital length 7.0, upper jaw length 3.4.

See Tables 4–9, 11, 13–16 for meristic data.

Dorsal finlet 3-spined; total dorsal-fin rays 39–41; lower lip with 4 lobe-like conical fimbriae near symphysis; eye with a complete or incomplete circlet of dermal flaps or protrusions below distal extremity, usually with a mesiodistal flap.

Without scales between dorsal-fin base and lateral-line arch; 30–31 scales in lateral-line arch, 16–17 in straight lateral line; two terminal scales on caudal-fin base (Fig. 15b); longitudinal scale rows 3 + 1 + 3. Pseudobranchiae 5 (one specimen examined); infraorbital canal with some paired pores; premaxillary pedicel reaches to or barely past rear margin of orbit.

Coloration.—Well-marked specimens (Fig. 17) with a dark bar crossing sides of head, eyes and interorbital, and with 7 principal saddle-like bars crossing dorsum and upper half of side from nape to caudal-fin base. Principal bars often pale centered with narrow dark margins; bars mostly equal to or narrower than interspaces but somewhat wider near midline of side; some fish with incomplete secondary bars between principal bars.

Etymology.—Named after Elizabeth Heal in partial recognition for her years of efficient and willing assistance, without which my ichthyological studies would surely be more difficult.

Comparisons.—*Gillellus healae* is best distinguished from Atlantic congeners by high counts of segmented dorsal-fin rays (27–29 against 14–24) and by its distinctive coloration (Fig. 17). This species further differs from both *G. jacksoni* and *G. greyae* in having fewer dorsal spines (11–13 against 17–20) and from *G. uranidea* in having more dorsal-fin elements (39–41 against 28–32) and segmented anal-fin rays (31–33 against 21–24). *Gillellus healae* is similar to the Pacific *G. semicinctus* in coloration and most meristic features but differs in modal number of pectoral-fin rays (13 against 12 in *semicinctus*), in lacking scales above the lateral-line arch (present in adult *semicinctus*), and in the presence of paired pores in the infraorbital canal (absent in *semicinctus*).

Remarks.—Gilbert (1890) based his description of *G. semicinctus* (type-species of *Gillellus*) on specimens from Pacific and Gulf of Mexico collections. The specific name was restricted to the Pacific population by Jordan (1897) but it has since been incorrectly applied to Atlantic material by a number of authors. The

species described here is conspecific with Gilbert's Gulf of Mexico material and most references to Atlantic specimens of *G. semicinctus* are referable to *G. healae*.

This species is poorly represented in collections and squamation and is incomplete in the majority of available specimens. Most have 3–8 dermal protrusions or flaps below the distal curvature of the eye but these are best developed in large fish. The smallest transformed male examined is 44.7 mm SL.

Three faded specimens (24.5–28.7 mm SL), taken off Aruba, are not included among the paratypes, although they agree in meristics and other features. These fish, identified as "?*Gillellus semicinctus*" by Caldwell and Caldwell (1964), apparently represent the only record of *G. healae* from the Caribbean Sea.

Distribution.—Excepting the Aruba material, *G. healae* is known only from the offings of South Carolina (33°16'30"N) to the Tortugas in southeastern Florida, and from the offings of Fort Myers to Pensacola, Florida, in the eastern Gulf of Mexico. Available data show that most specimens have been taken in dredge or SCUBA collections within a depth range of 21.3–73.2 m.

Material Examined.—24 specimens, 20.8–55.0 mm SL, including holotype and 16 paratypes.

Holotype.—USNM 134249 (46.7 mm SL, transformed male), West Florida, off Pensacola, 29°18'15"N, 85°32'00"W, 45.7 m, beam trawl, 7 Feb. 1885, ALBATROSS Sta. 2370.

Paratypes.—UNITED STATES, East Florida: FSM 24485 (2, 40.6–40.9), off St. Augustine, 29°53'05"N, 80°24'30"W, 45.7 m, scallop dredge, 8 July 1961, SILVER BAY Sta. 3183. HBF 107-3997 (1, 27.7), reef off Ft. Pierce, 27°31'12"N, 80°06'30"W, 21.3–22.9 m, SCUBA, 9 June 1977, F. Stanten and R. S. Jones. USNM 153153 (1, 20.8), off Palm Beach, 54.8–73.2 m, dredge, 20 Apr. 1950, McGinty. USNM 160659 (1, 34.8), Tortugas, W. H. Longley. West Florida: USNM 44302 (1, 31.7, syntype of *G. semicinctus*), off Ft. Myers, 26°19'00"N, 83°11'00"W, 49.4 m, dredge, 18–22 Mar. 1889, GRAMPUS Sta. 5108. USNM 44301 (1, 38.6, syntype of *G. semicinctus*), 26°28'00"N, 82°46'00"W, 30.2 m, dredge, 22–23 Mar. 1889, GRAMPUS Sta. 5112. GCRL 16914 (1, 35.0, cleared and stained), 28°19'00"N, 84°21'00"W, 50.3 m, dredge, 18 June 1974, MAFLA Sta. II-L. USNM 221433 (1, 43.2), 28.8 km WSW of Panama City Beach, 36.6 m, dredge, 31 Oct. 1977, R. L. Shipp and party. ANSP 144082 (1, 38.2), 29°04'00"N, 85°14'00"W, 36.6 m, dredge, 25 July 1975, BLM Sta. 15-4A. USNM 148525 (1, 55.0), 29°14'30"N, 85°29'30"W, 49.4 m, 7 Feb. 1885, ALBATROSS Sta. 2372. USNM 221432 (1, 53.9), 30°01'30"N, 85°54'54"W, 27.7 m, dredge, 27 June 1974, MAFLA Sta. III-G. GCRL 16915 (1, 37.1), 29°56'00"N, 86°06'00"W, 36.6 m, dredge, 28 June 1976, BLM Sta. 40-5-A. USA 6277 (1, 21.0), 30°06'00"N, 86°37'00"W, 42.7 m, dredge, 26 May 1979, J. T. Williams. FSU 22308 (1, 42.3), 30°10'00"N, 86°41'30"W, 21 July 1971, Sta. 7120-33, R/V TURSIOPS. GCRL 16916 (1, 44.2), 30°07'30"N, 86°45'00"W, 43.9–51.2 m, dredge, Feb. 1977, R. L. Shipp and party.

Other Material.—UNITED STATES, South Carolina: GCRL 17176 (1, 27), GCRL 17177 (1, 31), GCRL 17178 (1, 37). West Florida: UWF uncat. (1, 22.7). LESSER ANTILLES, Aruba: LACM 22243 (3, 24.5–28.7).

Gillellus jacksoni new species
Figure 17

Gillellus semicinctus (not of Gilbert, 1890). Metzelaar, 1919:147 (misidentification; Aruba).

Diagnosis.—Dorsal spines 17–19; segmented dorsal-fin rays 18–20; segmented anal-fin rays 28–30; total lateral-line scales 43–46; lower lip fimbriae usually 4; with or without 6 or more dark bars crossing dorsum from nape to caudal-fin base.

Description.—Measurements (mm) of 24.9 mm SL, female or young male, holotype follow: caudal-fin length 4.3, length of uppermost segmented caudal-fin ray 3.9, length of lowermost segmented caudal-fin ray 3.8, depth of caudal peduncle 1.5, body depth 4.0, predorsal length 4.7, preanal length 7.7, head length 5.3, head breadth 3.2, maxillary to upper opercular angle 5.1, maxillary to upper

preopercular angle 3.6, diameter of bony orbit 1.2, height of eye 0.7, postorbital length 3.6, upper jaw length 1.9.

See Tables 4–9, 11, 13–16 for meristic data.

Dorsal finlet 3-spined; total dorsal-fin rays 36–38; lower lip usually with 4 lobe-like fimbriae near symphysis; eye with a complete or incomplete circlet of dermal flaps or protrusions below distal extremity, usually with a mesiodistal flap.

Specimens larger than 17 mm SL with a row of small scales above lateral-line arch, some fish with two rows between origin of lateral line and dorsal-fin base; 24–28 scales in lateral-line arch, 18–19 in straight lateral line; one enlarged terminal scale on caudal-fin base; longitudinal scale rows 3 + 1 + 3. Pseudobranchiae 9 (one specimen examined); infraorbital canal without paired pores; premaxillary pedicel reaches rear margin of orbit.

Coloration.—Well-marked specimens with 6–7 narrow and poorly defined dark bars crossing dorsum to lateral midline from nape to caudal-fin base and with incomplete secondary bars between (Fig. 17); principal bars not clearly wider near lateral midline. Predorsum and dorsolateral part of head variably barred and blotched with pale and brownish.

Etymology.—Named after Felix N. Jackson, Museum Technician (GCRL), in partial recognition for his years of competent and willing performance of myriad ichthyological chores.

Comparisons.—The combination of 17–19 dorsal spines, 18–20 segmented dorsal-fin rays, 28–30 segmented anal-fin rays, 18–19 straight lateral-line scales and 43–46 total lateral-line scales distinguishes *G. jacksoni* from all congeners. Among Atlantic forms, only *G. greyae* shares the scale row above the lateral-line arch and high counts of 17–19 dorsal spines (13–15 in others). *Gillellus jacksoni* is distinguished from *G. greyae* by the presence of one rather than two terminal scales on the caudal-fin base, by having fewer lower lip fimbriae (2–4 against 4–16) and segmented anal-fin rays (28–30 against 31–35), and by the absence of paired pores in the infraorbital canal (present in *greyae*).

Remarks.—Some scales are present above the lateral-line arch in a 14.8 mm fish but their distribution cannot be determined at ×60 magnification; other specimens (16.9–25.3 mm) have a complete row of scales beginning below the 1st–4th dorsal spines.

The 14.8 mm specimen has 10, unbranched, segmented caudal-fin rays, this count is 1 + 7 + 2 in a 16.9 mm fish and 1 + 8 + 1 in other material. The only available transformed male is 25.3 mm SL.

Metzelaar's (1919) counts for his specimen of "*Gillellus semicinctus*" from Aruba are in error. This fish (ZMA 114.167) has 19 + 18 dorsal-fin rays (rather than 14 + 25), 28 segmented anal-fin rays (not 30) and 26 + 18 rather than 25 + 18 lateral-line scales.

Distribution.—*Gillellus jacksoni* is known only from Anguilla I., St. Barthelemy, Union I. and Aruba in the Caribbean Sea; recorded depth range is 0–16.8 m.

Material Examined.—11 specimens, 14.8–25.3 mm SL, including holotype and 10 paratypes.

Holotype.—ANSP 144081 (24.9 mm SL, female or young male), Lesser Antilles, St. Barthelemy, Fourche I., bay on NW shore, 6.1–6.7 m, Sta. TE-50, J. C. Tyler and party.

Paratypes.—LESSER ANTILLES, Anguilla I.: ANSP 116536 (1, 14.8), Dowlings Shoal, W of Crocus Bay, 15.2–16.8 m, Sta. TE-62, J. C. Tyler and party. St. Barthelemy: ANSP 105438 (4, 20.1–24.1) and GCRL 16917 (2, 22.8–24.2), taken with holotype. Grenadine Is., Union I.: ANSP 116535 (1, 16.9), GCRL 16918 (1, 20.8, cleared and stained), reef at harbor entrance E of Clifton, 0–1.5 m, Sta. TE-9, 25 June 1965, J. C. Tyler and party. Aruba: ZMA 114.167 (1, 25.3), 1904–05, J. Boeke.

Gillellus greyae Kanazawa
Figure 18

Gillellus semicinctus (not of Gilbert, 1890). Longley and Hildebrand, 1941:245 (misidentification, in part; Tortugas, Florida).
Gillellus greyae Kanazawa, 1952:88, fig. 12 (original description; Tortugas, Florida).

Diagnosis.—Dorsal spines 18–20; segmented dorsal-fin rays 20–24; segmented anal-fin rays 31–35; total lateral-line scales 50–58; lower lip fimbriae 4–16; with or without 6 or more dark bars crossing dorsum from nape to caudal-fin base.

Description.—Measurements (mm) of 48.4 mm SL, female or young male, holotype follow: caudal fin damaged, depth of caudal peduncle 2.2, body depth 7.5, predorsal length 9.4, preanal length 15.5, head length 10.0, head breadth 7.3, maxillary to upper opercular angle 9.4, maxillary to upper preopercular angle 7.1, diameter of bony orbit 2.1, height of eye 1.1, postorbital length 6.4, upper jaw length 4.7.

See Tables 4–9, 11, 13–16 for meristic data.

Dorsal finlet 3-spined; total dorsal-fin rays 39–43; lower lip fimbriae usually 6–12, average 8.6; eye with complete or incomplete circlet of dermal flaps or protrusions below distal extremity, usually with a mesiodistal flap; 1st preopercular canal often with additional minute pores above distal pore.

Squamation somewhat variable above lateral-line arch; most subadults and adults with a single row of scales above most of arch and 2–3 short rows below anterior part of dorsal fin; some scales may be present in 18–20 mm specimens but some 30–40 mm fish have only a few isolated and embedded scales above the arch; 27–33 scales in lateral-line arch, 22–25 in straight lateral line; two terminal scales on caudal-fin base (Fig. 15b), often lost in preserved material; longitudinal scale rows 4–5 + 1 + 4–5. Pseudobranchiae 6 (one specimen examined); some paired pores in infraorbital canal; premaxillary pedicel reaches rear margin of orbit.

Coloration.—Most material pale in preservative, without persistent color pattern. Well-marked specimens with 6 primary dark bars from nape to caudal-fin base and with incomplete secondary bars between (Fig. 18); principal bars end at or just below lateral midline, not pale-centered and not clearly broadened below; suborbital, eye and interorbital crossed by a dark bar; dorsolateral part of head with irregular dark shading or blotches behind eye.

Comparisons.—The combination of 18–20 dorsal spines, 20–24 segmented dorsal-fin rays, modally 13 pectoral-fin rays, 22–25 straight lateral-line scales and high counts of labial fimbriae (6–12 in 95% of specimens examined) distinguishes *G. greyae* from all congeners. Among Atlantic species, *G. jacksoni* shares the presence of scales above the lateral-line arch and counts of 18–20 dorsal spines (11–15 in others), but *G. greyae* is readily distinguished by higher numbers of lower lip fimbriae (usually 4 in *jacksoni*). See under *G. jacksoni* for additional comparisons.

Remarks.—Caudal-fin rays may be unbranched in some 24 mm specimens but the count is usually 1 + 8 + 1 in fish longer than 40 mm SL. Numbers of lower lip fimbriae vary ontogenetically; the regression equation and associated data follow: $y = 4.048 + 0.109x$ ($N = 122$, SL range 15.0–77.0, $\bar{x} = 42.3$, $\bar{y} = 8.6$, $\sigma x = 12.6$, $\sigma y = 2.2$, $r = 0.612$).

This species attains a size greater than that of any known congener (78 mm SL against 55 mm). Among present material, the smallest transformed male is 44.8

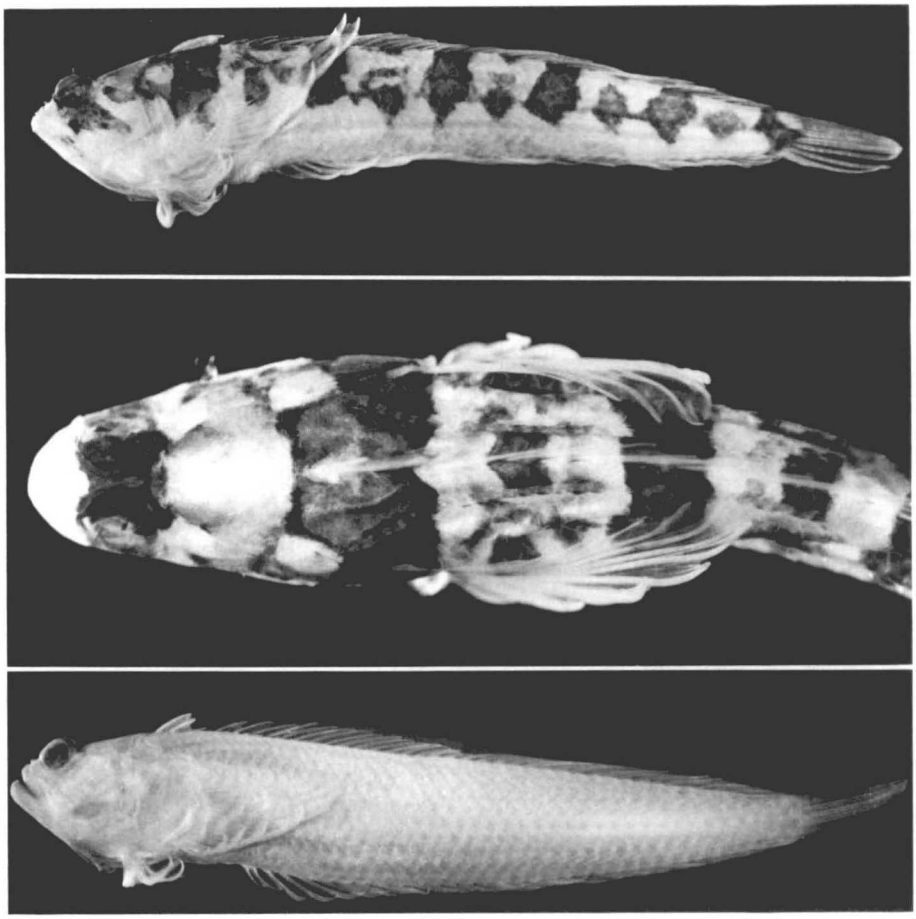

Figure 18. *Gillellus greyae* Kanazawa. Top and middle: ANSP 116534 (31.1 mm SL, juvenile). Bottom: ANSP 110777 (41.7 mm SL, female).

mm SL; enlarged ovaries were noted in a 44.5 mm female and a 73 mm fish contained 727 ovarian eggs.

Distribution.—Present materials show *G. greyae* to range from St. Lucie Co., southeastern Florida (ca. 27°N), to Ilha Itaparica, State of Bahia, Brazil (ca. 13°S). The species is well represented in the Bahamas, Antilles and on western Caribbean shores from Isla Mujeres, Quintana Roo, México to Isla Cubagua, Venezuela. There are no known specimens from the area between southeastern Venezuela and Ilha Itaparica, Brazil. Similarly, there are no confirmed collections from the Gulf of Mexico (north of the Florida Keys) but a record of "*Gillellus semicinctus*" from Alacran Reef, México (Hildebrand et al., 1964) may be based on misidentified *G. greyae*.

A 37 mm SL specimen (FMNH 48719), reportedly collected from a tidepool in Building Bay, Bermuda by L. L. Mowbray, was included among the paratypes of *G. greyae* by Kanazawa (1952). There are no other Bermuda records of this species and, for reasons discussed under *Dactyloscopus tridigitatus*, the occurrence of *Gillellus greyae* at Bermuda is questionable.

The majority of specimens are from depths of 0–6 m but there is a SCUBA sample from 24.4–27.4 m.

Material Examined.—159 specimens, 15.3–77.7 mm SL, including holotype and five paratypes.

Holotype.—USNM 116881 (48.4 mm SL, female or juvenile male), Florida, Tortugas, W. H. Longley.

Paratypes.—UNITED STATES, Florida: USNM 88113 (1, 35.0) and USNM 160658 (3, 37.2–63.0), data as for holotype. CUBA: USNM 82551 (1, 44.7), reef at Lavesos Italianos, 2 June 1914, Tomas Barreras Expdn., J. B. Henderson and P. Bartsch.

Other Material.—UNITED STATES, East Florida, St. Lucie Co.: HBF 107-1780 (6, 33.2–55.1). Martin Co.: FSU 12053 (2, 43.7–47.2). Palm Beach Co.: FAU 68-1 (2, 25.6–29.8), FAU 73-1 (2, 16.7–35.2), FSU 11281 (1, 37.9), FSU 12014 (1, 21.6), UMML 33343 (1, 49.8). Broward Co.: FAU 69-1 (1, 55). Dade Co.: FAU 67-2 (5, 45.3–50.6), FDNR 7081 (1, 26.1), UMML 5570 (1, 33.5), UMML 10104 (1, 34.4), UMML 11928 (1, 46.9), UMML 33344 (1, 35.8), UMML 33345 (1, 44.4). Monroe Co.: BMNH 1933.10.12.79 (1, 55.2), CAS-SU 8208 (1, 44.8), FDNR 6721 (4, 26.9–49.4), UMML 9108 (2, 43.6–48.4), UMML 10774 (1, 24.1), UMML 18245 (2, 36.3–42.8), UMML 19319 (6, 36.9–48.4), UMML 19422 (1, 47.9), UMML 19642 (2, 43.3–57.2), UMMZ 87967 (2, 47.0–58.8), UMMZ 205441 (5, 38.5–56.3). BAHAMA IS.: AMNH 23955 (1, 20.0), AMNH 25993 (3, 34.0–40.1), AMNH 26127 (2, 46.1–68.3), AMNH 30033 (1, 59.2), AMNH 31149 (1, 41.7), AMNH 34691 (2, 17.9–23.1), ANSP 110774 (1, 27.3), ANSP 110775 (1, 18.3), ANSP 110776 (1, 21.2), ANSP 110777 (3, 42.1–53.6), ANSP 110778 (1, 28.6), ANSP 110779 (1, 50.8), ANSP 110780 (1, 42.1), ANSP 110781 (1, 31.3), ANSP 110782 (1, 19.8), ANSP 110783 (1, 51.2), ANSP 110784 (2, 25.8–37.2), ANSP 110785 (4, 20.4–50.4), ANSP 110786 (1, 22.0), ANSP 110787 (1, 15.7), ANSP 110788 (2, 58.0–64.2), ANSP 110789 (1, 31.3), ANSP 110790 (2, 15.3–25.0), ANSP 110791 (3, 34.9–38.9), ANSP 110792 (3, 24.1–29.9), ANSP 110793 (2, 20.0–47.9), ANSP 111669 (1, 29.5), ANSP 116464 (1, 26.2), ANSP 126662 (1, 73.0), ANSP 126663 (2, 22.2–23.6), ANSP 126664 (2, 63.0–63.4), ANSP 144213 (1, 45.0), FAU 68-4 (1, 45.3), FAU 68-5 (1, 58.0), FSM 8805 (1, 49.1), FSM 8806 (1, 42.7), FSM 14126 (1, 62.0), GCRL 16910 (2, 63.4–66.3, cleared and stained), GCRL 16911 (2, 44.3–54.6), UMML 12631 (3, 41.2–77.7), UNC 4896 (2, 52.9–62.6). GREATER ANTILLES, Jamaica: UMML 13218 (2, 53.0–58.2). Puerto Rico: FMNH 83922 (1, 39.0). LESSER ANTILLES, Virgin Is.: UMML 33346 (1, 32.3). Antigua: FSM 11342 (2, 27.4–38.6), FSM 11399 (1, 16.6). Martinique: ANSP 103287 (1, 44.3), UMML 33347 (1, 32.0). St. Lucia: ANSP 116534 (1, 31.1), ANSP 144212 (1, 46.5). Tobago: ANSP 144394 (1, 36). MÉXICO, Quintana Roo: GCRL 2716 (4, 40.5–53.1). BELIZE: FMNH 83921 (1, 28.1). PROVIDENCIA IS.: FSM 24475 (1, 52.1), FSM 24477 (2, 43.5–65.5). PANAMÁ, Bocas del Toro: MCZ 52015 (2, 43.8–48.6). Canal Zone: ANSP 119236 (1, 67.7). VENEZUELA, Golfo de Venezuela: USNM 199558 (2, 39.3–41.6). Islas los Roques: USNM 195825 (1, 35.2). Isla Cubagua: UDONECI 862 (2, 35.0–41.0). BRAZIL, Bahia: GCRL 9323 (4, 39.3–42.1), MZUSP uncat. (2, 34.7–42.1).

Genus *Platygillellus* Dawson

Platygillellus Dawson, 1974:40 (type-species: *Gillelus* (=*Gillellus*) *rubellulus* Kendall and Radcliffe 1912, by original designation).

Diagnosis.—Dorsal fin with an isolated or semi-isolated 3–4 spined anterior finlet originating on nape; lower jaw rounded in dorsal aspect, without a conical fleshy anterior projection; fimbriae present on opercle and lips; anterior naris tubiform, located dorsally just behind anterior rim of preorbital; posterior naris a simple pore located on preorbital, between anterior naris and orbit (Fig. 14c); eyes somewhat protrusile but not stalked, usually with one or more dermal flaps or protrusions; venter scaled in subadults and adults (Fig. 6); scales present or absent on side of head and on pectoral-fin base; scales more numerous in lateral-line arch than in straight lateral line; canals unbranched in scales of straight lateral line, usually with a pore on dorsal margin; tip of adpressed pectoral fin fails to reach descending portion of lateral-line arch; principal preopercular canals 3, the 1st unbranched and with a single distal pore; pectoral-fin rays modally 14; segmented caudal-fin rays modally 11; premaxillary pedicel not continued well past rear margin of orbit; without predorsal interneurals; caudal vertebrae 23–30.

Description.—See Dawson, 1974.

Comparisons.—Among Atlantic genera of dactyloscopids, the combination of dorsal-fin origin on nape and presence of an isolated or semi-isolated anterior finlet is shared with *Gillellus* and *Leurochilus*. *Platygillellus* is readily differentiated by the higher modal count of pectoral-fin rays (14 against 12–13) and by the presence of upper lip fimbriae and scales on the venter in subadults and adults (upper lip fimbriae and venter scales absent in *Gillellus* and *Leurochilus*). *Platygillellus* shares the scaled venter with the Pacific genus *Heteristius*, but the latter has a 2-spined dorsal finlet and modally 12, unbranched, segmented caudal-fin rays (finlet 3–4-spined, segmented caudal rays 11 in *Platygillellus*).

Remarks.—Species of *Platygillellus* are usually marked with prominent and persistent alternating, broad, saddle-like, dark and pale bars crossing the dorsum and all or part of the sides. These species appear to be most commonly found in or near rock or coral habitats and individual collections seldom include more than a few specimens. Maximum confirmed depth of capture is 37 m; maximum known size is 62 mm SL. Three species occur in the eastern Pacific (Dawson, 1974) and two Atlantic species are reported here.

Platygillellus rubrocinctus (Longley)
Figure 19

Gillellus rubrocinctus Longley, 1934:257 (original description; Tortugas, Florida).
Gillellus quadrocintus Beebe and Hollister, 1935:222, fig. 27 (=*quadrocinctus*, a lapsus calami; original description; Union I., Grenadines).
Gillellus quadricinctus. Carvalho, 1957:3 (misspelling).
Heteristius rubrocinctus. Bailey et al., 1960:42 (new combination).

Diagnosis.—Dorsal finlet 3-spined, its height usually less than half of predorsal length; dorsal spines 15–17 (usually 16); total dorsal-fin rays 30–33; segmented anal-fin rays 23–27 (24–26 in 98% of specimens); straight lateral-line scales 16–19; without scales on head.

Description.—Measurements (mm) of 33.4 mm SL, female or juvenile male, holotype follow: caudal-fin length 6.3, length of uppermost segmented caudal-fin ray 3.8, length of lowermost segmented caudal-fin ray 3.9, depth of caudal peduncle 2.1, body depth 6.2, predorsal length 6.9, length of 1st dorsal spine 2.7, preanal length 11.4, head length 8.1, head breadth 5.8, maxillary to upper opercular angle 7.3, maxillary to upper preopercular angle 5.4, diameter of bony orbit 1.3, height of eye 0.8, postorbital length 4.5, upper jaw length 3.2.

See Tables 4–11, 13–16 for meristic data.

Dorsal finlet isolated, or united to remainder of dorsal fin by an incised membrane; segmented dorsal-fin rays 14–17 (usually 15–16), segmented caudal-fin rays simple in early juveniles (12–15 mm SL), modally 2 + 7 + 2 in subadults and adults (Fig. 15c); upper lip fimbriae 6–15; lower lip fimbriae 7–21. Eye usually with an incomplete circlet of dermal flaps or protrusions below distal curvature and with a mesiodistal flap, eye ornamentation usually best developed in large specimens. First preopercular canal often with minute pores above distal pore.

Scales present on venter and pectoral-fin base in late juveniles and adults (Fig. 6a); without scales on upper part of opercle; last lateral-line scale the terminal scale on caudal-fin base; subadults and adults usually with 3 rows of scales between origins of dorsal fin and lateral line, scales reduced to one row above posterior half of arch; arched lateral-line scales 21–25; total lateral-line scales 38–43; longitudinal scale rows 4–5 + 1 + 4–5. Pseudobranchiae 5–6 (two specimens examined); premaxillary pedicel reaches to or barely past rear margin of orbit.

Table 10. Frequency distributions of upper lip fimbriae in Atlantic species of sand stargazers (* primary type)

	Upper lip fimbriae														
Genus and species	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Dactyloscopus															
crossotus					1	1	18	39	101*	30	7	2			
tridigitatus						1	7	30	238	117	81	9		1	
boehlkei									12	20	22*	3			
foraminosus										2	2	1		4*	3
comptus						2	21	18	11*						
moorei							1	4	20	28	40*	16		3	2
poeyi									3	12	83	93		57*	4
Platygillellus															
rubrocinctus			6	8	11	22	28	42	43	15	5	2			
smithi										1*					
Myxodagnus															
belone							2	3	8*	9	1				
Dactylagnus															
peratikos											4	3	1*	1	1
Storrsia															
olsoni	1*														

Coloration.—Typically with 4 broad dark bars crossing dorsum and most or all of side from nape to caudal-fin base (Fig. 19), the 1st often not clearly differentiated from markings on head; configuration of bars variable, some narrowing ventrad and somewhat triangular, some with an angular indentation near lateral midline, whereas others may be blotched with pale and much broader than the usually subequal pale interspaces; bars variably dark reddish to more or less mottled brown; pale interspaces plain or flecked with brown. Much of side and dorsum of head irregularly spotted or blotched with brownish; membranes of dorsal finlet usually brown; dorsal and caudal fin-rays spotted with brown; portions of pectoral fin overlying dark body bars often blotched or spotted with brown; oral pigmentation usually present.

Comparisons.—*Platygillellus rubrocinctus* shares the count of 15–17 dorsal spines with *P. smithi* (Atlantic) and *P. altivelis* (Pacific), but these species are characterized by their high, sail-like, dorsal finlet (finlet low in *rubrocinctus*). The finlet is 3-spined in *P. rubrocinctus* (4-spined in *smithi*) and *P. rubrocinctus* further differs from *P. altivelis* in higher numbers of straight lateral-line scales (16–19 against 11–14). The low dorsal finlet is shared with two Pacific congeners (*P. rubellulus* and *P. bussingi*) but *P. rubrocinctus* differs from these in lower modal counts of dorsal spines (16 against 18), segmented dorsal-fin rays (32 against 34) and segmented anal-fin rays (25 against 27 or 28). Furthermore, *P. rubrocinctus* lacks scales on the head (present in subadult and adult *rubellulus*) and has fewer total lateral-line scales (38–43 against 45–48) and lower lip fimbriae (7–21 against 21–33) than *P. bussingi*.

The holotype of *Gillellus quadrocinctus* Beebe and Hollister is lost (Mead, 1958) but the original description clearly shows this specimen to be conspecific with *Platygillellus rubrocinctus*.

Table 11. Frequency distributions of lower lip fimbriae in Atlantic species of sand stargazers (* primary type)

Genus and species	Lower lip fimbriae																									
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Dactyloscopus																											
crossotus														1	2	4	30	44*	53	44	12	2					
tridigitatus																	4	10	83	130	146	76	21	5			
boehlkei																					3	6	13*	22	9		
foraminosus																							4	3	2	2*	
comptus																	1	16	20*	10	5						
moorei																1	1	1	11	16	26	20	19	10*	4		2
poeyi																		1	8	27	97	83	27*	7	3		
Gillellus																											
uranidea	19	4*	54																								
healae			13*																								
jacksoni	1		9*																								
greyae			1	7	15	14	21	31	15	8	5	1	1	1	2												
Platygillellus																											
rubrocinctus						1	2	1	3	7	15	18	31	34	31	27	12	6	2	1							
smithi								1*																			
Myxodagnus																											
belone																	1	3*	2	7	4	5	3				
Dactylagnus																											
peratikos																		2	1	2*	1	1		2			
Storrsia																											
olsoni													1*														

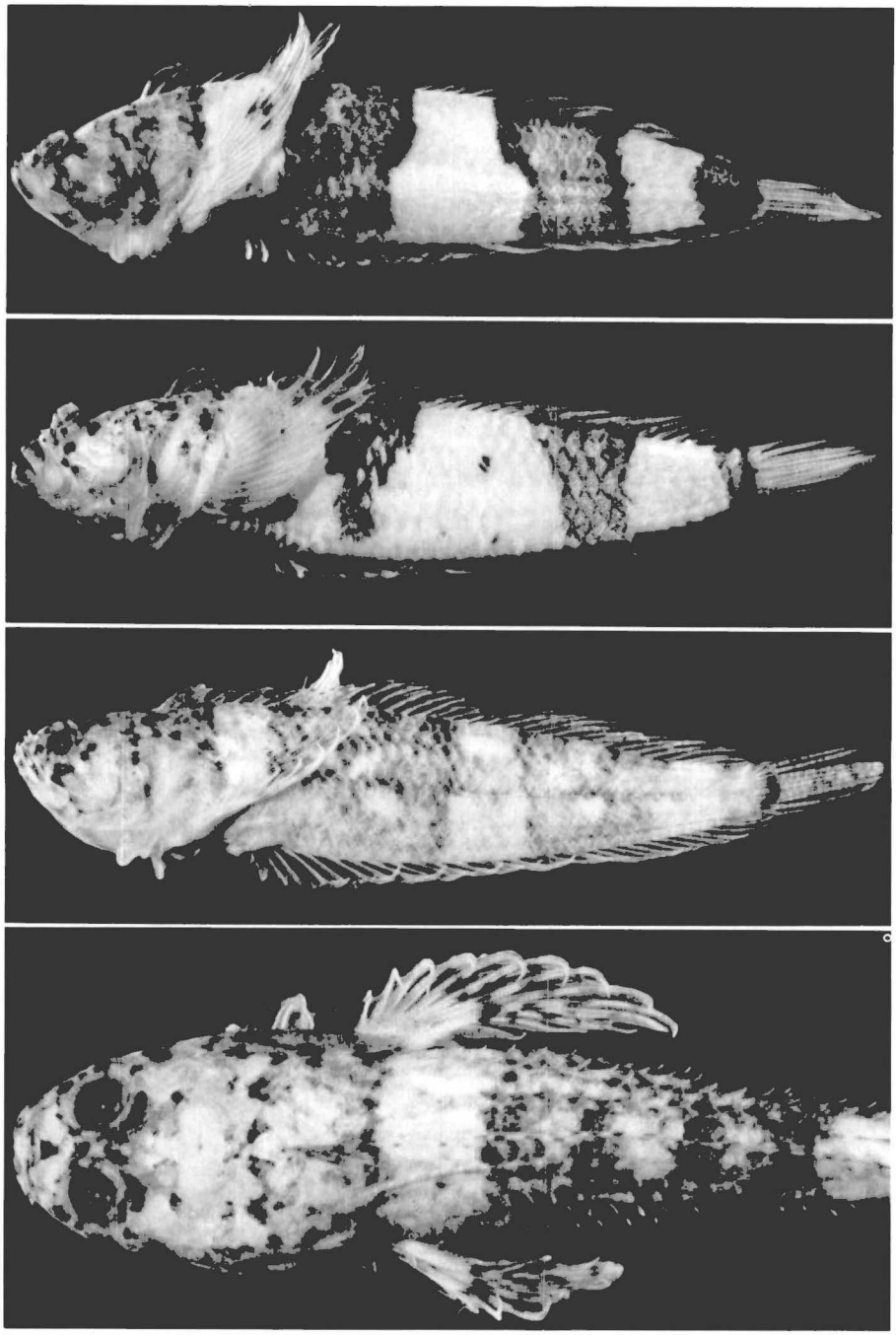

Figure 19. *Platygillellus rubrocinctus* (Longley). Upper pair, top: ANSP 106079 (41.5 mm SL, female), bottom: HBF 107-1779 (41.1 mm SL, female). Lower pair: GCRL 16907 (30.8 mm SL, female or juvenile male).

Remarks.—At least one scale is present on the ventral midline of an 11.7 mm fish, the venter is naked in a 12.2 mm specimen, but the midline is crossed by up to 10 rows of scales in undamaged fish 14.8 mm SL and larger. Similarly, scales are not developed on the pectoral-fin base in 11.7 and 12.2 mm specimens but some scales are present in 14.8 mm SL and larger fish. The distal eye-flap is slightly developed in a 13 mm specimen and the typical saddle-like markings are well developed in some 12 mm SL fish.

Numbers of upper and lower lip fimbriae increase ontogenetically; regression equations and associated data for each are as follows: *upper* $y = 2.990 + 0.236x$ ($N = 186$, SL range 12.0–47.0 mm, $\bar{x} = 32.1$, $\bar{y} = 10.6$, $\sigma x = 6.3$, $\sigma y = 2.1$, $r = 0.692$); *lower* $y = 7.202 + 0.246x$ ($N = 192$, SL range 12.0–47.0 mm, $\bar{x} = 31.3$, $\bar{y} = 14.9$, $\sigma x = 7.1$, $\sigma y = 2.4$, $r = 0.715$).

Among material examined, the smallest transformed male is 34.5 mm SL. A 34.6 mm SL female contained 115 ovarian eggs and 145 were counted from a 38.2 mm SL specimen.

Distribution.—*Platygillellus rubrocinctus* is known from St. Lucie Co., southeastern Florida (27°29'N), to Islas Los Roques (ca. 11°50'N) and Bahia de Mochima (State of Saucre) on the mainland coast of Venezuela (Cervigón, 1968). The species is unknown from the Gulf of Mexico (north of the Florida Keys) but it is well represented in the Bahamas, Antilles and western Caribbean from Isla Mujeres, Quintana Roo, México to the vicinity of Colón, Panamá.

Pinto's (1960) record of *P. rubrocinctus* (as *Gillellus quadrocinctus*) from Baia de Tamandaré, State of Pernambuco, Brazil is apparently based on the misidentified specimen of *Dactyloscopus tridigitatus* subsequently described as *Tamandareia oliveirai* by Carvalho and Pinto (1965).

Among 40 samples with acceptable data, 15 are from depths of 0–2 m, 19 from 0–9 m, and there are 4 SCUBA collections from 6.1–13.7 m, one from 15.2 m and another from 30.5 m. A number of samples appear to have come from collection sites including rock or coral bottom.

Material Examined.—371 specimens, 10.7–47.1 mm SL, including holotype.

Holotype.—USNM 108870 (33.4 mm, female or juvenile male), Florida, Tortugas.

Other Material.—UNITED STATES, East Florida, St. Lucie Co.: HBF 107-1779 (3, 33.2–45.7), HBF 107-3201 (3, 32.4–42.2). Martin Co.: ANSP 110218 (1, 20.8), FDNR 6330 (1, 35.9). Palm Beach Co.: FAU 67-1 (2, 38.8–41.8), FAU 68-1 (1, 33.5), FAU 69-1 (1, 36.1), FAU 73-1 (1, 13.7), FSU 11273 (1, 37.8), FSU 11279 (1, 41.3). Broward Co.: FAU 71-28 (1, 35.2), FAU 71-64 (1, 32.1), FAU 72-4 (1, 42.8). Dade Co.: UMML 1882 (1, 39.5), UMML 9954 (1, 37.8). Monroe Co.: FSM 10865 (7, 11.4–41.2), FSM 11819 (3, 22.9–25.6), FSM 16177 (16, 27.0–44.8), UMML 27828 (5, 31.7–35.7), UMMZ 205448 (2, 28.0–36.3). BAHAMA IS.: AMNH 22774 (1, 30.4), AMNH 22958 (1, 33.6), AMNH 23314 (1, 37.0), AMNH 23958 (6, 25.2–36.8), AMNH 24017 (5, 11.5–35.0), AMNH 24132 (2, 37.8–42.2), AMNH 24718 (1, 46.1), AMNH 26128 (8, 15.5–40.5), AMNH 27368 (1, 41.6), AMNH 28499 (5, 10.7–45.6), AMNH 29044 (1, 33.6), AMNH 29092 (1, 30.6), AMNH 30032 (3, 36.0–41.9), AMNH 30789 (3, 32.0–37.2), AMNH 31202 (1, 34.5), AMNH 34008 (1, 19.6), AMNH 34068 (2, 14.8–14.9), AMNH 34218 (2, 34.1–35.7), AMNH 34344 (1, 24.5), AMNH 34689 (1, 12.2), ANSP 72220 (3, 21.8–37.2), ANSP 110198 (1, 35.9), ANSP 110199 (5, 33.7–38.2), ANSP 110200 (1, 25.8), ANSP 110201 (2, 33.1–38.9), ANSP 110202 (5, 32.8–39.1), ANSP 110203 (4, 25.8–37.4), ANSP 110204 (2, 26.7–40.1), ANSP 110205 (1, 29.3), ANSP 110206 (4, 23.8–39.1), ANSP 110207 (2, 11.7–43.3), ANSP 110208 (2, 32.0–35.0, ANSP 110209 (1, 33.7), ANSP 110210 (3, 33.4–40.5), ANSP 110211 (7, 13.0–34.2), ANSP 110212 (2, 38.4–47.1) ANSP, 110213 (2, 40.4–46.6), ANSP 110214 (1, 31.8), ANSP 110215 (1, 34.5), ANSP 110216 (5, 22.0–33.8), ANSP 110217 (1, 19.2), ANSP 110384 (5, 13.3–40.7), ANSP 117877 (1, 35.6), ANSP 126665 (1, 38.7), ANSP 126666 (8, 29.6–33.6), FAU 68-6 (1, 38.4), FSM 8802 (1, 34.8), FSM 8803 (1, 29.1), FSM 8804 (1, 32.4), FSM 9595 (2, 35.1–45.4), FSM 13378 (1, 30.5), FSM 18414 (1, 18.4), GCRL 16905 (2, 35.1–39.0, cleared and stained), GCRL 16906 (2, 32.1–33.8), UNC 4868 (1, 28.9). GREATER ANTILLES, Cayman Is.: ANSP 104901 (1, 36.2), ANSP 105035 (2, 31.5–34.9),

FSM 17848 (1, 39.0), FSM 18795 (1, 26.1). Puerto Rico: ANSP 115589 (1, 24.6), ANSP 118482 (1, 34.2), UMML 10324 (2, 19.9–21.3). LESSER ANTILLES, Virgin Is.: ANSP 110216 (5, 22.0–33.8), BMNH 1976.7.15.173 (4, 38.0–41.5). Anguilla: ANSP 106076 (1, 21.9), ANSP 106083 (2, 29.4–31.4). St. Martin: ANSP 106079 (5, 21.4–41.5). St. Barthelemy: ANSP 106074 (1, 15.0). Antigua: FSM 11343 (3, 11.7–19.4), FSM 11400 (3, 25.1–31.7), FSM 11943 (2, 23.4–34.8). Isla Aves: UMML 32004 (8, 22.6–35.7). Dominica: GCRL 16907 (3, 30.8–37.5), USNM 198287 (10, 27.0–34.3), USNM 198651 (6, 26.1–31.7), USNM 201835 (1, 13.7). Martinique: ANSP 106080 (1, 25.2), UMML 33348 (4, 25.7–33.2). St. Lucia: ANSP 106078 (2, 21.0–22.5). St. Vincent: ANSP 106072 (2, 27.0–31.7), ANSP 144228 (1, 25.7). Barbados: ANSP 110217 (1, 19.2). Grenadine Is.: ANSP 106073 (10, 20.5–34.7), ANSP 106075 (4, 20.4–33.2), ANSP 106077 (7, 26.2–32.6), ANSP 106081 (4, 18.6–40.8), ANSP 106082 (4, 21.4–32.8), ANSP 106084 (15, 16.3–28.3). Grenada: ANSP 106085 (20, 16.9–36.0), GCRL 16908 (5, 21.6–32.5). Curaçao: GCRL 1690 (2, 40.0–40.3). MÉXICO, Quintana Roo: GCRL 2717 (1, 26.7), MPM 11356 (1, 29.5), MPM 11506 (1, 21.6), UMML 9374 (1, 21.5). BELIZE: FMNH 80475 (1, 24.8), FMNH 93888 (1, 32.3), FMNH 93889 (2, 30.0–36.5), FMNH 93890 (2, 17.6–26.1), FMNH 93891 (2, 19.9–33.3), FMNH 93892 (1, 28.2), GCRL 15768 (1, 33.0), UMML 9464 (2, 29.4–40.9), UMML 9829 (1, 23.6), USNM 221546 (1, 22.0). HONDURAS, Roatan Is.: FMNH 80472 (1, 32.8), FMNH 80474 (1, 23.1). PROVIDENCIA Is.: FSM 18847 (3, 33.1–38.8), FSM 24478 (1, 34.6). NICARAGUA: CNP 76-120 (1, 30.5), GCRL 14800 (1, 31.8), UMML 23053 (1, 37.8), UMML 23054 (2, 26.0–27.2), UMML 23056 (7, 30.3–38.8). PANAMÁ, Bocas del Toro: MCZ 52018 (1, 32.9). Canal Zone: MCZ 47602 (1, 27.0), MCZ 52019 (1, 42.2), SIO 67-45-60 (1, 42.9). VENEZUELA, Islas Los Roques: USNM 179265 (1, 28.1), USNM 195824 (1, 29.4).

Platygillellus smithi new species
Figure 20

Diagnosis.—Dorsal finlet 4-spined, its height about equal to predorsal length; dorsal spines 15; total dorsal-fin rays 29; segmented anal-fin rays 22; straight lateral-line scales 11–12; without scales on head.

Description.—Measurements (mm) of 34.0 mm SL, female or juvenile male, holotype follow: caudal-fin length 7.6, length of uppermost segmented caudal-fin ray 4.8, length of lowermost segmented caudal-fin ray 5.2, depth of caudal peduncle 2.5, body depth 7.0, predorsal length 7.8, length of 1st dorsal spine 8.2, preanal length 12.5, head length 9.4, head breadth 6.7, maxillary to upper opercular angle 8.5, maxillary to upper preopercular angle 6.0, diameter of bony orbit 2.0, height of eye 1.7, postorbital length 5.6, upper jaw length 4.5.

See Tables 4–11, 13–16 for meristic data.

Distance between 3rd–4th dorsal spines about equals distance between 1st–3rd, the finlet very high and separate from remainder of dorsal fin (Fig. 6b); segmented caudal-fin rays 2 + 6 + 2; upper lip fimbriae 13; lower lip fimbriae apparently 9. Left eye with a lobate mesiodistal flap; right eye without distal flap but with 4 closely spaced proximal flaps on posteromesial margin.

Midline of venter crossed by 8–9 rows of scales; without scales on upper part of opercle; pectoral-fin base naked, without trace of scale pockets; last lateral-line scale the terminal scale on caudal-fin base; scales in 2 rows between lateral-line arch and base of anterior 2–3 dorsal spines, one row of scales above remainder of arch; lateral-line scales 25 + 11 on left side, 26 + 12 on right; longitudinal scale rows 3 + 1 + 3. Premaxillary pedicel reaches just past rear margin of orbit.

Coloration.—Dorsum and most of side crossed by 4 saddle-like bars from nape to caudal-fin base (Fig. 20); bars brownish, the interspaces tan; head with traces of 3 short dark bars radiating below eye, otherwise irregularly spotted and shaded lightly with brown chromatophores; dorsal finlet brown with pale distal margin; dorsal-fin rays elsewhere with some scattered chromatophores but not clearly spotted; other fins essentially pale.

Etymology.—Named after the collector of the holotype, C. Lavett Smith, Curator of Fishes (AMNH).

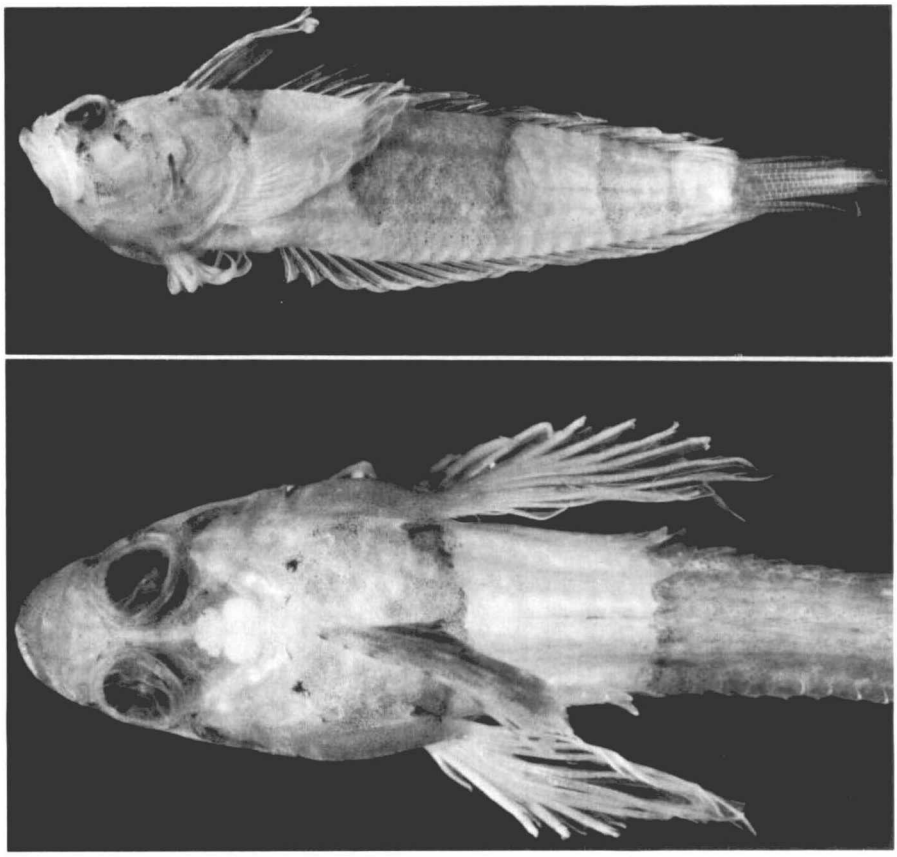

Figure 20. *Platygillellus smithi* n. sp. AMNH 27215 (34.0 mm SL, female or juvenile male, holotype).

Comparisons.—The holotype and only known specimen of *P. smithi* differs from all congeners in the presence of 4 rather than 3 spines in the dorsal finlet. In addition, *P. smithi* apparently lacks scales on the pectoral-fin base which are present in subadults and adults of all congeners. The sail-like dorsal finlet of *P. smithi* is shared only with the Pacific *P. altivelis*, but *P. smithi* further differs from this species in having somewhat fewer dorsal-fin elements (29 against 30–33), segmented anal-fin rays (22 against 24–26), total lateral-line scales (36–38 against 39–42), and caudal vertebrae (23 against 25–27). In addition to differences in the dorsal finlet (Fig. 6), *P. smithi* is readily separated from its Atlantic congener by the lower number of straight lateral-line scales (11–12 against 15–19 in *rubrocinctus*).

Remarks.—Ten segmented caudal-fin rays occur in about 7% of examined specimens of *P. rubrocinctus*. The presence of this count in the holotype of *P. smithi* presumably represents similar variation fron the count of 11 segmented rays usually found in species of *Platygillellus*.

Absence of *P. smithi* from other samples from the Bahamas, an area subject to extensive collecting in recent years, is noteworthy. It must be assumed that the holotype strayed from a depth or habitat which is sampled infrequently or that the population density of *P. smithi* is lower than that of most Atlantic dactyloscopids. The majority of Bahama collections appear to be from depths of 0–

10 m. If *P. smithi* occupies a niche similar to that of its sail-finned Pacific congener, *P. altivelis*, collections from greater depths may well be more productive. One hundred and eleven specimens of *P. altivelis* (15 collections) were taken in the following depths: one fish in 0–1.8 m, one in 3–7.6 m, 21 in 8–9 m, 77 in 14–18 m and 11 in 21–37 m.

Material Examined.—Holotype and only known specimen.

Holotype.—AMNH 27215 (34.0 mm SL, female or juvenile male), Bahama Is., Little Inagua I., coral patch reef 183 m off SW point, 0–7.6 m, Sta. S66-26, 18 Mar. 1966, C. L. Smith and party.

Genus *Myxodagnus* Gill

Myxodagnus Gill, 1861:269 (type-species: *Myxodagnus opercularis* Gill 1861, by original designation).

Diagnosis.—Dorsal-fin origin well behind nape, near vertical from anal-fin origin (Fig. 21); dorsal fin continuous, without anterior finlet; body slender, fusiform; lower jaw long, strongly protruding, conical, pointed to narrowly rounded in dorsal aspect; fimbriae present on opercle and lips; anterior naris tubiform, located dorsally just behind anterior rim of preorbital; posterior naris a simple pore located on preorbital between anterior naris and orbit (Fig. 14d); eyes scarcely protrusile, without dermal flaps, papillae or pigmented spots; scales absent from head, pectoral-fin base and venter; about twice as many scales in straight lateral line as in arched portion; canals branched anteriad in straight lateral-line scales; tip of adpressed pectoral fin usually reaches beyond descending portion of lateral-line arch; infraorbital pores less than 10; principal preopercular canals 3, the 1st unbranched and with a single distal pore; pectoral-fin rays modally 13–15; segmented caudal-fin rays modally 10; premaxillary pedicel not continued past rear margin of orbit; with 4–7 predorsal interneurals; caudal vertebrae 34–40.

Description.—See Dawson, 1976.

Comparisons.—*Myxodagnus* shares the posterior insertion of the dorsal fin (near vertical from anal-fin origin) with two other genera of dactyloscopids, *Dactylagnus* and *Storrsia*. It differs from these in the slender fusiform body and protruding conical lower jaw (body not fusiform, lower jaw not conical in *Dactylagnus* and *Storrsia*). *Myxodagnus* also differs from *Dactylagnus* in the simple rather than usually branched 1st principal preopercular canal and in the presence of a few (usually 6–7) rather large pores in the infraorbital canal (pores small, more than 10 in *Dactylagnus*). Furthermore, *Myxodagnus* is readily separated from *Storrsia* by lower numbers of dorsal spines (7–11 against 14), higher numbers of scales in the straight lateral line (32–38 against 23) and location of posterior naris well behind the anterior rim of the preorbital (on rim in *Storrsia*).

Remarks.—Species of *Myxodagnus* are commonly associated with sand bottoms of coarse to moderate grain size. Few specimens are represented in Atlantic collections but samples of eastern Pacific populations often include fifty or more individuals. Maximum recorded depth of capture is 18–46 m but most collections are from 0–5 m; maximum known size is 84 mm SL. Three species, one with two subspecies, are recognized in the eastern Pacific (Dawson, 1976) and there is one species known from the Atlantic.

Myxodagnus belone Böhlke
Figure 22

Myxodagnus belone Böhlke, 1968:6, figs. 2–3 (original description; Andros I., Bahamas).

Diagnosis.—Dorsal spines 8–9; total dorsal-fin rays modally 38; pectoral-fin rays

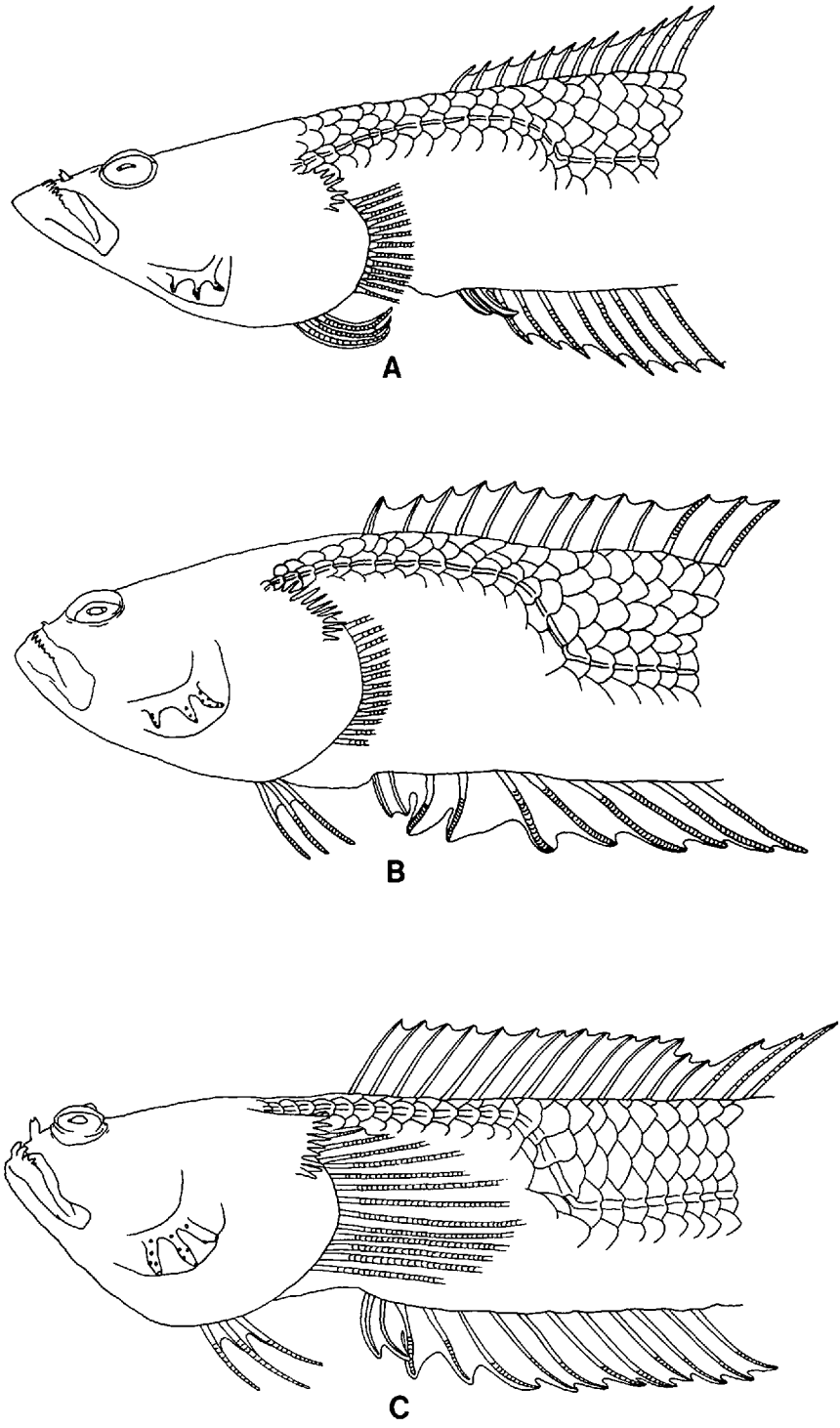

Figure 21. Lateral aspect of head and anterior part of body of Atlantic dactyloscopids with dorsal-fin origin behind nape. A, *Myxodagnus belone*; B, *Dactylagnus peratikos*; C, *Storrsia olsoni*.

modally 13; lateral line not interrupted near posterior angle of arch; predorsal interneurals usually 5.

Description.—Measurements (mm) of 49.5 mm SL, transformed male, holotype follow: caudal-fin length 7.5, length of uppermost and lowermost segmented caudal-fin rays 7.2, depth of caudal peduncle 2.4, body depth 5.3, predorsal length 14.4, preanal length 14.7, head length 9.8, head breadth 5.1, maxillary to upper opercular angle 8.1, maxillary to upper preopercular angle 6.2, diameter of bony orbit 1.8, height of eye 1.3, preorbital length 1.2, postorbital length 4.9, upper jaw length 3.0.

See Tables 4–16 for meristic data.

Diameter of pigmented eye about equals preorbital length; 1st preopercular canal with 1–2 pores; upper lip fimbriae 10–14; lower lip fimbriae 18–24; caudal fin usually 1 + 8 + 1 in adults (Fig. 15d).

Subadults and adults usually with two rows of scales above origin of lateral-line arch, usually 1.5–2 rows above posterior half of arch; last lateral-line scale the penultimate scale on lower part of caudal-fin base; longitudinal scale rows 4 + 1 + 4 (one specimen examined). Pseudobranchiae 4–10 (Böhlke, 1968); premaxillary pedicel reaches posterior third of orbit; predorsal interneurals 4–6 (5 in 13 of 17 counts).

Coloration.—Study material pale and without persistent markings (Fig. 22). Böhlke (1968) noted marginal brownish flecks on many scales on the dorsum, 5–6 diffuse blotches along anal-fin base and a faint brownish spot centered on caudal-fin base.

Comparisons.—This is the only Atlantic representative of the genus and *M. belone* is readily distinguished from other Atlantic dactyloscopids by characters in key and diagnoses.

Compared to Pacific congeners, *M. belone* differs from *M. opercularis* Gill in lower modal counts of pectoral-fin rays (13 against 14) and predorsal interneurals (5 against 6). It also has fewer pectoral-fin rays than *M. macrognathus* Hildebrand (modally 13 against 15) and that species usually has 10 dorsal spines (8–9 in *belone*). Furthermore, *M. belone* differs from both *M. opercularis* and *M. macrognathus* in lower modal values for segmented anal-fin rays (35 against 36–37) and straight lateral-line scales (33–34 against 35 or 36). *Myxodagnus belone* is most similar to *M. sagitta* Myers and Wade, a Galápagos Is. endemic. These species share modal counts of 13 pectoral-fin rays, 35 segmented anal-fin rays, 35 caudal vertebrae and 5 predorsal interneurals and they overlap in other meristic features. Most *M. sagitta* are heavily blotched or striped with dark brown and the lateral line is interrupted near the posterior angle of the arch in 88% of examined specimens (continuous in examined *belone*). Pale specimens of *M. sagitta* with a continuous lateral line are not readily separable from *M. belone*.

Remarks.—The smallest transformed male is 49.1 mm SL and Böhlke (1968) counted 238 ovarian eggs from a 49.5 mm SL female.

Distribution.—This species is known only from the type material taken in depths of 0–3.7 m from the Bahamas and Puerto Rico.

Material Examined.—27 specimens, 42.0–57.0 mm SL, including holotype, allotype and 25 paratypes (for complete data on allotype and paratypes, see Böhlke, 1968).

Holotype.—ANSP 111606 (49.5 mm SL male), Bahama Is., Andros I., ca. 2.2 km N of Mastic Cay, 3.7 m, Sta. 565, 8 Nov. 1961, J. E. Böhlke and party.

Table 12. Frequency distributions of pores in the 1st principal preopercular canal in Atlantic species of sand stargazers (* primary type). Species of *Leurochilus, Gillellus* and *Platygillellus* typically have one distal pore in the 1st canal

	Number of pores																										
Genus and species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	21	24	27	30	33	36	39	42	45	>48
Dactyloscopus																												
crossotus		4	75	37	34	20	14	9*	9	2	3	3																
tridigitatus		2	54	171	174	61	30	16	7	2	1																	
boehlkei						2	11	7	7	13*	9	2	3	1	1	1												
foraminosus																			1	1			2		1	1	1	8*
comptus		1	1	5	18	12*	9	1	1	5	1		1															
moorei			1	4	6	10	16	15	14	16	12	14	9*	3	2	1	1	3										
poeyi		1	1			2	14	10	12	15	30	33	43	28	20	8	13*	6	17	6								
Myxodagnus																												
belone	15	11*																										
Dactylagnus																												
peratikos	1*	2	6	1																								
Storrsia																												
olsoni				1*																								

Table 13. Frequency distributions of scales in the arched portion of the lateral line in Atlantic species of sand stargazers (* primary type)

	Number of scales																				
Genus and species	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Dactyloscopus																					
crossotus	3	63	122*	4																	
tridigitatus	1	42	370	9																	
boehlkei			7	39*	3																
foraminosus				3																	
comptus			9	43*																	
moorei		1	16	69*	5																
poeyi		1	36*	174	13																
Leurochilus																					
acon		1	4*	5	1																
Gillellus																					
uranidea										1	3	9	13*	8	2						
healae																		1	2*		
jacksoni												1	2	3	1	1*					
greyae															4	9*	17	21	11	11	8
Platygillellus																					
rubrocinctus									6	13	52	38*	4								
smithi													1*	1*							
Myxodagnus																					
belone		2	11*	8	2																
Dactylagnus																					
peratikos			3	4*	2																
Storrsia																					
olsoni							2*														

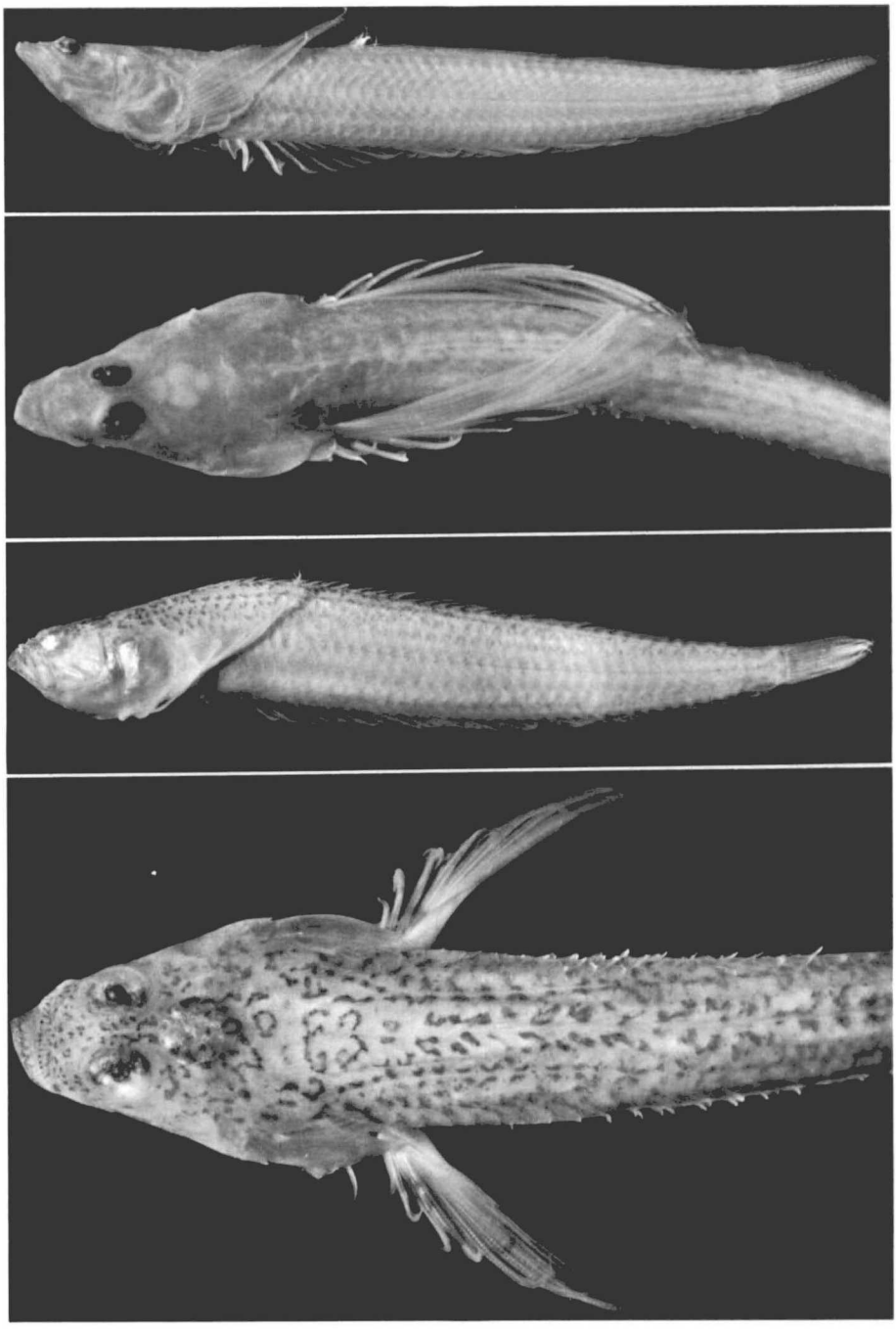

Figure 22. Upper pair: *Myxodagnus belone* Böhlke. ANSP 111607 (49.4 mm SL, transformed male, paratype). Lower pair: *Dactylagnus peratikos* Böhlke and Caldwell. GCRL 9976 (65.5 mm SL, female). Anterodorsal profile somewhat distorted in both specimens.

Allotype.—FSM 15655 (49.0 mm SL female), Bahama Is.

Paratypes.—Bahama Is.: ANSP 111607 (3, 49.8–57.0), ANSP 111608 (2, 42.0–47.0), FSM 13376 (4, 47.9–54.1), UMML 23904 (2, 44.5–46.6). Puerto Rico: ANSP 111609 (1, 50.2, cleared and stained), ANSP 111610 (3, 46.6–53.1), ANSP 117414, formerly UPR 2575 (4, 51.0–51.6), GCRL 16909, formerly ANSP 111610 (1, 51.7), USNM 202735 (5, 49.1–51.5).

Genus *Dactylagnus* Gill

Dactylagnus Gill, 1862:505 (type-species: *Dactylagnus mundus* Gill 1862, by original designation and monotypy).

Diagnosis.—Dorsal-fin origin well behind nape, near vertical from anal-fin origin (Fig. 21); dorsal fin continuous, without anterior finlet; lower jaw broadly rounded in dorsal aspect, without conical anterior fleshy projection; fimbriae present on opercle and lips; anterior naris tubiform, located dorsally just behind anterior rim of preorbital; posterior naris a simple pore located on preorbital, between anterior naris and orbit (Fig. 14e); eyes scarcely protrusile, without dermal flaps, papillae or pigmented spots; scales absent from head, pectoral-fin base and venter; about twice as many scales in straight lateral line as in arched portion; canals branched anteriad in straight lateral-line scales; tip of adpressed pectoral fin reaches beyond descending portion of lateral-line arch; infraorbital pores more than 10; principal preopercular canals 3, the 1st usually with a short distal branch and with 1–10 pores; pectoral-fin rays modally 13 or 15 (in *mundus*); segmented caudal-fin rays modally 10; premaxillary pedicel not continued past rear margin of orbit; with 2–6 predorsal interneurals; caudal vertebrae 31–41.

Description.—See Dawson, 1976.

Comparisons.—Among the three genera of dactyloscopids with dorsal fin originating well behind the nape, *Dactylagnus* is superficially most similar to *Storrsia* in that both lack the slender fusiform body and protruding conical lower jaw characteristic of *Myxodagnus*. *Dactylagnus* is readily distinguished from *Storrsia* by lower numbers of dorsal spines (8–12 against 14), more numerous segmented anal-fin rays (29–41 against 26) and location of the posterior naris well behind the anterior rim of the preorbital (on rim in *Storrsia*).

Remarks.—Species of *Dactylagnus* are most commonly associated with sand bottoms of coarse to moderate grain size. Few specimens are known from Atlantic waters but samples of fifty or more individuals are not uncommon in eastern Pacific collections. Maximum recorded depth of capture is 15.2 m but the majority of samples are from 0–2.0 m; maximum known size is 148 mm SL. Two species occur in the eastern Pacific (Dawson, 1976) and one species is known from Atlantic collections.

Dactylagnus peratikos Böhlke and Caldwell
Figure 22

Dactylagnus sp. Caldwell et al., 1959:27 (listed, Costa Rica).
Dactylagnus peratikos Böhlke and Caldwell, 1961:537, fig. 1 (original description; Tortuguero Beach, Limón Prov., Costa Rica).

Diagnosis.—Total dorsal-fin rays 38–40; segmented anal-fin rays 33–35; pectoral-fin rays modally 13; predorsal interneurals usually 4; abdominal vertebrae usually 11; dorsal-fin origin slightly in advance of vertical from anal-fin origin.

Description.—Measurements (mm) of 41.5 mm SL, female or juvenile male, holotype follow: caudal-fin length 5.8, length of uppermost segmented caudal-fin ray

Table 14. Frequency distributions of scales in the straight portion of the lateral line in Atlantic species of sand stargazers (* primary type)

	Number of scales																							
Genus and species	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Dactyloscopus																									
crossotus																				2	23	81*	70	14	2
tridigitatus																		1	21	191	180	29			
boehlkei																		1	11	35*	2				
foraminosus																			1	1	1				
comptus																4	34	13*	1						
moorei																		10	29	42*	10				
poeyi																			4	61	133*	25	1		
Leurochilus																									
acon									1	3	6	1*													
Gillellus																									
uranidea		1	11	21*	3																				
healae						1*	2																		
jacksoni								5*	3																
greyae												4	21	42	14*										
Platygillellus																									
rubrocinctus					12	38*	36	16	11																
smithi	1*	1*																							
Myxodagnus																									
belone																						1	10	11	1*
Dactylagnus																									
peratikos																						1	6*	2	
Storrsia																									
olsoni												1*	1*												

Table 15. Frequency distributions of total lateral-line scales in Atlantic species of sand stargazers (* primary type).

Genus and species	Number of scales																								
	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
Dactyloscopus																										
crossotus													8	40	79*	57	8									
tridigitatus											3	36	191	166	26											
boehlkei												2	14	30*	3											
foraminosus													1	1	1											
comptus									2	4	36	10*														
moorei											1	13	33	35*	9											
poeyi													9	76*	117	22										
Leurochilus																										
acon	1		1	4	4*	1																				
Gillellus																										
uranidea				3	6	7	12*	5	3																	
healae															2*	1										
jacksoni											3	2	1	2*												
greyae																		3	3	13	16*	12	19	10	1	4
Platygillellus																										
rubrocinctus						6	27	51*	26	2	1															
smithi				1*		1*																				
Myxodagnus																										
belone																9	8	5*	1							
Dactylagnus																										
peratikos																3	3*	3								
Storrsia																										
olsoni									1*	1*																

5.8, depth of caudal peduncle 1.8, body depth 5.9, predorsal length 10.3, preanal length 12.2, head length 7.5, head breadth 5.0, maxillary to upper opercular angle 6.7, maxillary to upper preopercular angle 5.3, diameter of bony orbit 1.7, height of eye 1.1, postorbital length 3.4, length of upper jaw 2.8.

See Tables 4–16 for meristic data.

Segmented dorsal-fin rays 28–30; upper lip fimbriae 14–18; lower lip fimbriae 19–25; segmented caudal-fin rays usually 1 + 8 + 1 in subadults and adults.

Usually with one row of scales above anterior part of lateral-line arch, two rows of scales between dorsal-fin base and apex of arch; 15–17 scales in lateral-line arch, 32–34 in straight lateral line; last lateral-line scale the penultimate scale on caudal-fin base (Fig. 15e); longitudinal scale rows 4 + 1 + 5 (one specimen examined). Pseudobranchiae 10–11 (3 specimens examined); premaxillary pedicel reaches middle or anterior third of orbit; predorsal interneurals 4–5 (4 in 8 of 9 counts); abdominal vertebrae 11 (4 specimens examined).

Coloration.—Ground color light tan; dorsum and upper parts of side irregularly spotted or mottled with brown (Fig. 22); subadults and adults without indications of dark bars crossing dorsum; oral pigmentation present.

Comparisons.—The only Atlantic representative of the genus *Dactylagus* is distinguished from other Atlantic dactyloscopids by characters in key and diagnoses.

Compared to Pacific congeners, *D. peratikos* shares modal counts of 13 pectoral-fin rays and 11 abdominal vertebrae with *D. parvus* Dawson, but these values are respectively, 15 and 13 in *D. mundus* Gill. Dorsal fin originates in advance of anal-fin origin in *D. peratikos* and *D. parvus* (behind origin in *mundus*), but *D. peratikos* is more or less intermediate between these Pacific species in other meristic features. There are 38–40 dorsal-fin elements and 32–34 straight lateral-line scales in *D. peratikos,* whereas these counts are, respectively, 34–38, 28–33 in *D. parvus* and 38–45, 33–39 in *D. mundus*. Similarly, there are usually 4 predorsal interneurals in *D. peratikos,* 2–3 in *D. parvus* and 5 in *D. mundus*.

Remarks.—Among examined material, the smallest transformed male is 47.7 mm SL, enlarged ovaries were noted in a 48.6 mm SL female. In Pacific populations, the smallest size at maturity is about 70 mm SL in *D. mundus* and 23 mm SL in *D. parvus*.

Distribution.—*Dactylagnus peratikos* is known only from shallow shore collections from the vicinity of Tortuguero, Costa Rica and from Devil's Beach, Fort Sherman, Panamá.

Material Examined.—10 specimens, 41.5–65.5 mm SL, including holotype.

Holotype.—FSM 7176 (41.5 mm SL, female or juvenile male), Costa Rica, Limón Prov., Tortuguero Beach, 10°34'N, 83°32'W, Ogren Sta. 451, 30 July 1958, L. H. Ogren.

Other Material.—COSTA RICA, Limón: FSM 11259 (5, 46.6–51.8), FSM 11288 (1, 47.4). PANAMÁ, Canal Zone: GCRL 9976 (2, 65.0–65.5), GCRL 16904 (1, 58.4, cleared and stained).

Storrsia new genus

Type-species.—*Storrsia olsoni* new species.

Diagnosis.—Dorsal-fin origin well behind nape, near vertical from anal-fin origin (Fig. 21); dorsal fin continuous, without anterior finlet; lower jaw broadly rounded in dorsal aspect, without a conical anterior fleshy projection; fimbriae present on opercle and lips; anterior naris tubiform, located just behind anterior rim of preorbital; posterior naris opens through a somewhat flared tubule extending anteriad from anterior rim of preorbital (Fig. 14f); eyes scarcely protrusile, with a mesial

Table 16. Frequency distributions indicating location of lateral-line deflection below interspace between dorsal-fin elements in Atlantic species of sand stargazers (* primary type)

	Interspace between dorsal-fin elements																			
Genus and species	4/5	5/6	6/7	7/8	8/9	9/10	10/11	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
Dactyloscopus																				
crossotus					12	84*	76	2												
tridigitatus					13	265	38													
boehlkei						6	45*	4												
foraminosus							7*													
comptus						3	35	16*												
moorei					1	4	59	31*	1											
poeyi						2	83*	118	2											
Leurochilus																				
acron					8*	4														
Gillellus																				
uranidea								1	12		25	34*	6	2						
healae																3	2	3	4	2*
jacksoni														7*	4					
greyae											14*	57	37	2						
Platygillellus																				
rubrocinctus								5	30		43	41*	5		1					
smithi														1*						
Myxodagnus																				
belone	1	17*	7	1																
Dactylagnus																				
peratikos			2*	7	1															
Storrsia																				
olsoni					1*															

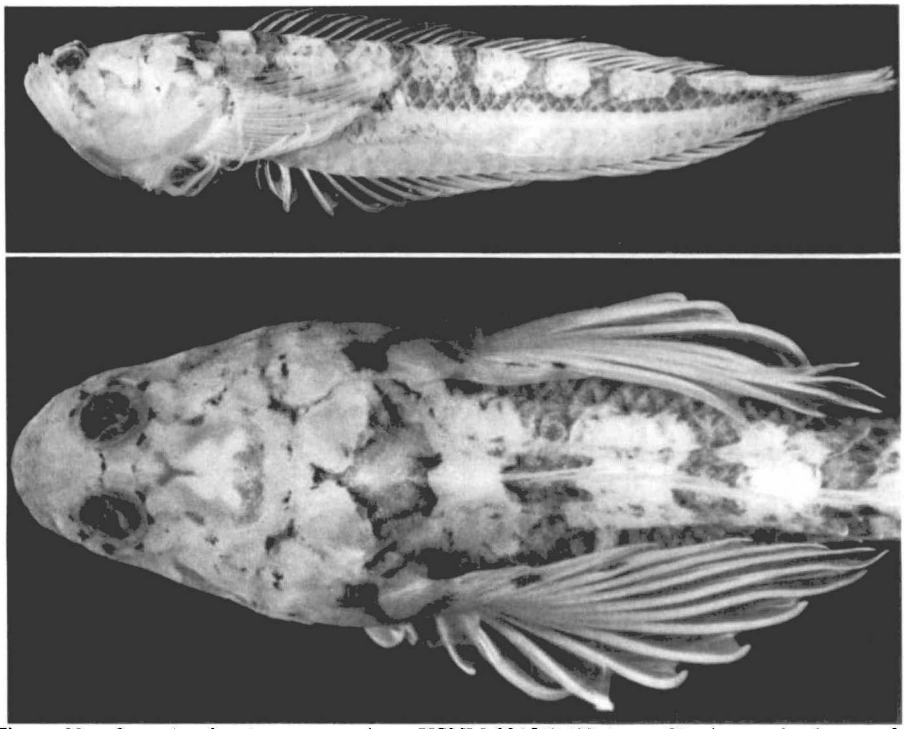

Figure 23. *Storrsia olsoni* n. gen. and sp. USNM 221547 (27.4 mm SL, incompletely transformed male, holotype).

flap or protrusion on distal margin; without scales on head, pectoral-fin base or venter; number of arched lateral-line scales about equals number in straight portion; canals not branched in straight lateral-line scales; tip of adpressed pectoral fin reaches beyond descending portion of lateral-line arch; principal preopercular canals 3, the 1st unbranched and with a distal pore and additional pores above; pectoral-fin rays 13; segmented caudal-fin rays 10; infraorbital canal with some paired pores; premaxillary pedicel reaches a short distance past rear margin of orbit; predorsal interneurals present; caudal vertebrae 28.

Description.—The genus is monotypic, see description of *S. olsoni.*

Etymology.—Named *Storrsia,* after Storrs L. Olson, Associate Curator, Division of Birds (USNM). Gender: F.

Comparisons.—The external morphology of the posterior naris of *Storrsia* (Fig. 14f) is unique among genera of dactyloscopids. This naris is on the preorbital rim in most species of *Dactyloscopus* (Fig. 3a) but here the opening consists of a tubeless pore located just below the rim margin and it is not visible in dorsal aspect. In *Storrsia,* this naris opens through a well-developed, flared tubule which, in part, overhangs the premaxilla.

In addition, *Storrsia* differs from other genera with dorsal-fin origin behind nape (*Myxodagnus, Dactylagnus*) in a number of characters. These genera have canals of the straight lateral-line scales branched anteriorly (unbranched in *Storrsia*) and they lack the eye flap or dermal protrusion present in *Storrsia.* Furthermore, the premaxillary pedicel reaches past the posterior rim of the orbit in

Table 17. Selected characters distinguishing genera of the family Dactyloscopidae, together with number of subordinate taxa in Atlantic and Pacific waters

Character	*Dactyloscopus*	*Dactylagnus*	*Myxodagnus*	*Storrsia*	*Sindoscopus*	*Gillellus*	*Leurochilus*	*Platygillellus*	*Heteristius*
Segmented caudal-fin rays, modally	10	10	10	10	10	10	11	11	12
Principal preopercular canals	3	3	3	3	4	3	3	3	>6
1st canal branched	+	+*	–	–	–	–	–	–	–
Dorsal-fin origin on nape	+	–	–	–	+	+	+	+	+
Dorsal finlet present	–	–	–	–	–	+	+	+	+
Canals branched anteriad in straight lateral-line scales	+*	+	+	–	–	–	–	–	–
Pectoral-fin rays, modally	13	13, 15	13–15	13	14	12, 13	13	14	14
Posterior naris on preorbital rim	±	–	–	+	–	–	–	–	–
Upper lip fimbriae	+	+	+	+	+	–	–	+	+
Lower lip fimbriae	+	+	+	+	+	+	–	+	+
Venter scaled	–	–	–	–	–	–	–	+	+
Number of dorsal spines	9–15	8–12	7–11	14	20–22	11–23	14–17	15–19	19–22
Arched lateral-line scales	13–18	13–18	13–17	19	29–38	22–62	14–17	21–31	18–23
Abdominal vertebrae, modally	11	11, 13	12	11	11	11	10	10	10
Number of Pacific taxa	13	2	4	0	1	5	0	3	1
Number of Atlantic taxa	7	1	1	1	0	4	1	2	0

* Usually.

Storrsia (reaches middle or posterior third of orbit in *Myxodagnus* and *Dactylagnus*) and *Storrsia* has fewer caudal vertebrae than any member of these genera (28 against 31–41). *Storrsia* is perhaps most similar to *Dactylagnus* in gross morphology but it does not appear closely related to any previously recognized genus.

Storrsia olsoni new species
Figure 23

Diagnosis.—Diagnostic characters are those of the genus.

Description.—Measurements (mm) of 27.4 mm SL, incompletely transformed male, holotype follow: caudal-fin length 4.8, length of uppermost segmented caudal-fin ray 4.2, length of lowermost segmented caudal-fin ray 4.3, depth of caudal peduncle 1.9, body depth 4.8, predorsal length 7.9, preanal length 8.5, head length 6.6, head breadth 5.8, maxillary to upper opercular angle 5.3, maxillary to upper preopercular angle 4.5, diameter of bony orbit 1.2, height of eye 0.9.

See Tables 4–16 for meristic data.

Dorsal-fin origin in advance of anal fin, the latter originates below space between 2nd–3rd dorsal spine (Fig. 21); dorsal fin with 14 spines and 16 segmented rays; segmented anal-fin rays 26; segmented caudal-fin rays 1 + 8 + 1 (Fig. 15f); labial fimbriae simple; 1st preopercular canal with 3 pores above distal pore.

One row of scales above lateral-line arch, beginning below 2nd–3rd dorsal spine; 19 scales in lateral-line arch; 23 straight lateral-line scales on left side, 22 on right; last lateral-line scale the penultimate scale on caudal-fin base, not angled clearly ventrad (Fig. 15f); longitudinal scale rows 3 + 1 + 3. Pseudobranchiae 4 or 5; predorsal interneurals apparently 2 in radiograph; abdominal vertebrae 11.

Coloration.—Side with a moderately broad brown stripe just above midline from near axil of pectoral fin to caudal-fin base (Fig. 23); dorsum and sides crossed by 8 brown bars beginning on nape, and all but the 1st continue ventrad to unite with the lateral stripe; bars mostly narrower than pale interspaces; dorsum and upper part of side of head irregularly blotched, streaked or spotted with brown; upper 2–3 pectoral-fin rays with a few brown spots, other fins (except caudal-fin base) immaculate.

Etymology.—Named after Storrs L. Olson, collector of the holotype.

Remarks.—Markings of the holotype resemble those of some species of *Gillellus* (Figs. 17, 18) but the confluence of bars with the prominent lateral stripe forms a distinctive pattern not seen in other Atlantic dactyloscopids.

The holotype was taken with 17 specimens of *Dactyloscopus tridigitatus*.

Distribution.—Known only from the Brazilian type locality.

Material Examined.—Holotype and only known specimen.

Holotype.—USNM 221547 (27.4 mm SL, male), Brazil, Arquipelago de Fernando de Noronha, Ilha Fernando de Noronha, Saco de Atalaia, tidepool, 0–1 m, 23 July 1973, S. L. Olson.

Generic Characters and Relationships

Some characters employed in the recognition of genera are given in Table 17 and one concept of generic relationships, derived from external morphology and known aspects of reproductive behavior, is illustrated (Fig. 24); other possibilities are not discussed here. This treatment is not intended to imply any ancestor-

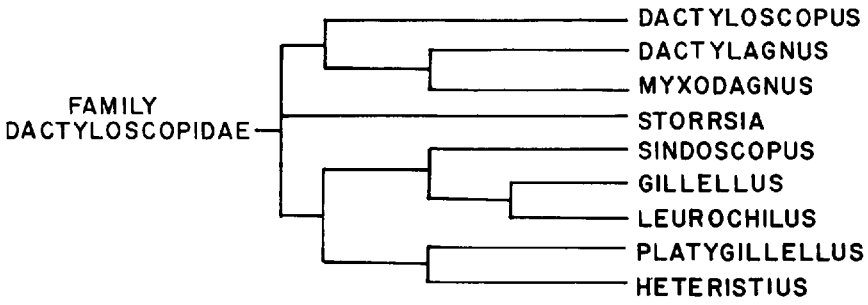

Figure 24. Dendrogram illustrating one concept of generic relationships in the Dactyloscopidae.

descendant sequence but it does group those forms which appear to be most closely related in respect to overall similarity.

As understood here, there appear to be two principal lineages within the Dactyloscopidae: the dactyloscopoids, including *Dactyloscopus, Dactylagnus* and *Myxodagnus,* and the gillelloids, including all other genera except *Storrsia.*

The dactyloscopoids share the anteriorly branched canal in the straight lateral-line scales, they typically have low frequencies of dorsal spines and arched lateral-line scales, and eggs are incubated by the male in ball-like clusters carried beneath the pectoral fins. Within *Dactyloscopus,* the posterior naris is located on the anterior rim of the preorbital (12 species) or between the anterior naris and the eye in the *D. crossotus* group (4 species). The latter could well be treated as a subgenus of *Dactyloscopus* but, as noted previously (Dawson, 1975), this serves little purpose at this time. In any event, *Dactylagnus* and *Myxodagnus* have lost some anterior dorsal-fin elements (often vestigial in *crossotus*) and location of the posterior naris in these genera is similar to that of the *Dactyloscopus crossotus* species group. Similarly, there is a reduction of branching in the 1st preopercular canal from *Dactyloscopus* (often multibranched) to the poorly branched or occasionally simple condition in *Dactylagnus* and the typically simple canal in *Myxodagnus. Dactylagnus* shares the general physiognomy of most species of *Dactyloscopus,* but the narrowed head and slender body of *D. crossotus* more nearly approaches that found in *Myxodagnus.*

The gillelloids lack an anterior branch in the canal of straight lateral-line scales (a median dorsal marginal pore may be present), they usually have comparatively high frequencies of dorsal spines and arched lateral-line scales, the posterior naris is located beween the anterior naris and eye, preopercular canals are not branched, all except *Sindoscopus* have an anterior dorsal finlet originating on the nape, and males are not known to incubate eggs beneath the pectoral fins. *Sindoscopus, Gillellus* and *Leurochilus* appear most closely related in that they share a generally similar slender body form and lack the scaled venter common to *Platygillellus* and *Heteristius. Sindoscopus* and *Gillellus* have 10 segmented caudal-fin rays (11 in *Leurochilus*) but *Sindoscopus* lacks the dorsal finlet (present in *Gillellus* and *Leurochilus*) and additionally differs in the presence of upper lip fimbriae and 4 principal preopercular canals (upper lip fimbriae absent, 3 canals in *Gillellus* and *Leurochilus*). *Gillellus* and *Leurochilus* share counts of 12–13 pectoral-fin rays (14 in *Sindoscopus*), but *Leurochilus* lacks lower lip fimbriae (present in *Gillellus*) and has fewer arched lateral-line scales than either *Gillellus* or *Sindoscopus. Platygillellus* and *Heteristius* share a unique combination of characters (Table 17) but differ in counts of segmented caudal-fin rays (11 against

12 in *Heteristius*) and principal preopercular canals (3 against >6 in *Heteristius*). Most species of *Platygillellus* develop scales on the pectoral-fin base (absent in *Heteristius*) and all have branched caudal-fin rays in adults (rays always simple in *Heteristius*).

Storrsia is somewhat of an enigma in that it appears to be intermediate between the dactyloscopoids and the gillelloids, albeit perhaps somewhat closer to the latter. Although structurally different externally, the location of the posterior naris on the preorbital rim is similar to that of most species of *Dactyloscopus* and some anterior dorsal-fin elements have been lost as in *Dactylagnus* and *Myxodagnus*. However, absence of the branched canal in straight lateral-line scales and presence of simple preopercular canals is a combination characteristic of gillelloids.

Five of the nine recognized genera occur in both Atlantic and Pacific waters. The remainder are monotypic with two occurring in the Atlantic (*Leurochilus, Storrsia*) and two in the Pacific (*Heteristius, Sindoscopus*). There are 29 subordinate taxa in the Pacific dactyloscopid fauna and 17 in the Atlantic. More thorough sampling of deeper sandy habitats may educe additional Atlantic forms.

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